ROADS *and* STREETS

HIGHWAYS • BRIDGES • AIR FIELDS • HEAVY CONSTRUCTION

A GILLETTE PUBLICATION

Gillette Publishing Co., 22 West Maple St., Chicago 10, Illinois • Accepted as Controlled Circulation Publication at Milwaukee, Wis.

Cover Scene: Rock drilling on the Connecticut Turnpike (see page 24). . . . In This Issue: How innovations stepped up paving job. Dozen other articles and reports plus highlights from AASHO's Atlantic City meeting.

February 1957

The Bethlehem shop-fabricated bar mats are made up of nine No. 5 bars and seven No. 3 bars.

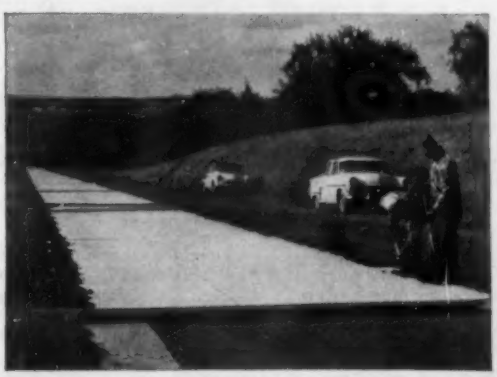
Continuous Reinforcement

IN 2-MILE STRETCH OF HIGHWAY NEAR YORK, PA.

During the relocating of sections of U. S. Route 111, between Harrisburg and York, Pa., it was decided to pave a two-mile stretch using continuous reinforcement instead of transverse contraction and expansion joints and standard reinforcement.

This longest stretch of continuously reinforced highway in Pennsylvania is four lanes wide, with a 20-ft medial strip. Each lane is 12 ft wide. A 9-in. slab was laid.

No transverse joints were used. Instead, special mats of deformed bars were laid to form the continuous steel reinforcement. The mats, which were furnished by Bethlehem, had a weight of approximately 181 lb per 100 sq ft and were placed at the midpoint after the first course of concrete had been struck off, just as ordinary mats are placed in reinforced-concrete paving, without any necessity for accessories.



H. J. Williams Company, of York, Pa., laid the continuous steel reinforcement and paved this two-mile stretch of Route 111.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

. . . for more details circle 203, page 16

ROADS AND STREETS

A GILLETTE PUBLICATION • FEBRUARY, 1957 • VOLUME 100 • NUMBER 2

Coming Articles

Next Month: Report on the Road Show

The "Greatest Machinery Show on Earth" in perspective, along with highlights of technical sessions. See March issue for this special presentation by the Roads and Streets editors.

Safe Blasting Alongside a Rail Line

How an eastern turnpike contractor maintained safety by keeping a berm built up between his work and the railroad.

Selection and Care of Construction Tires

What contractors need to know about latest tubeless, heavy-ply, extra wide tread, oversize, and other types of alternate tire equipment available for securing top efficiency on a particular project.

Design of a Prestressed, Pre-Tensioned Concrete Bridge

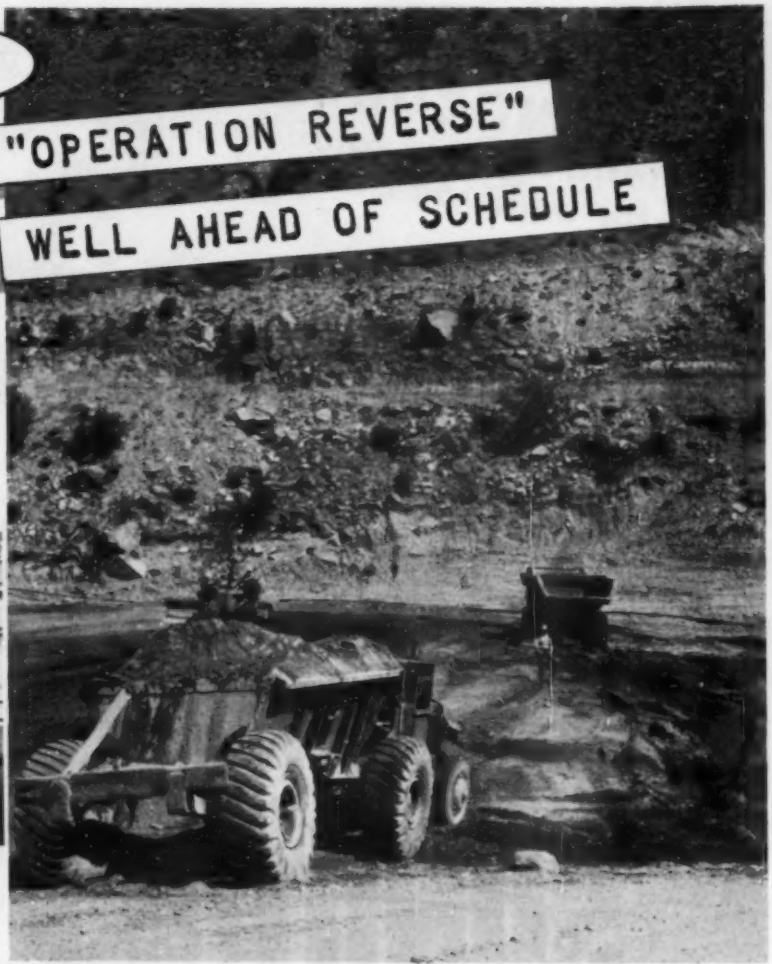
An actual design problem will be worked out in detail, on a type of small-span bridge deck which will be employed increasingly throughout the highway field.

Accepted as Controlled Circulation Publication at Milwaukee, Wisconsin. Published monthly. Subscription $5.00 per year.

GOODYEAR WAS THERE!

GLENDO DAM "OPERATION REVERSE"

WELL AHEAD OF SCHEDULE



HARNESSING THE NORTH PLATTE calls for reversal of usual dam-building procedure. A 21-foot-diameter, 2100-foot-long tunnel had to be bored *before* main construction—together with other preliminary work. The various contractors coordinated so well that almost *half* the scheduled work—tunnel AND dam—was completed in *one-third* allotted time. Picture shows equipment on Hard Rock Lug tires by Goodyear tackling 4½-million-yard haul.

WIDE-BASE TYPE SURE-GRIP LUG gets careful inspection—as do all tires on this fast-stepping job. Nearby Goodyear facilities keep tire inventories down and provide quick repair and recap service.

End your tube and flap troubles with Goodyear

TUBELESS TIRES!

STANDARD ON FOREMOST ORIGINAL EQUIPMENT, Goodyear *tubeless* tires and rims are proved the most airtight assembly. They may be specified for even the largest vehicles.

ADVANTAGES ARE MANY: Tube and flap troubles, tube replacements, are ended. Mounting is simple, safe and sure. Injuries are easily detected—and tire failures and down time drop to record lows.

Just be sure you specify GOODYEAR Tubeless on new equipment—or for economical change-over, for replacement, see your Goodyear dealer. Goodyear, Truck Tire Dept., Akron 16, Ohio.

NOW IN 3-T NYLON CORD—*TUBELESS* OR TUBE-TYPE!

Look for this nearby Goodyear dealer sign for better tire values—better tire care.

Buy and Specify **GOODYEAR**

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

All-Weather, Road Lug, Sure-Grip—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

. . . for more details circle 225, page 16

ROADS AND STREETS

Devoted to the design, construction, maintenance and operation of highways, streets, bridges, bridge foundations and grade separations; the construction and maintenance of airports. Represents 64 years of continuous publishing in the highway field; combined with Engineering and Contracting and Good Roads Magazines, established in 1892.

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503 TRUCK LOADS IN ONE DAY — Here's an example of a real money-making operation! A Minnesota contractor reports his LS-98 shovel with 1¼-yard dipper loaded out 503 five-yard trucks in eleven hours. That's real production. Owner and operator give credit to Speed-o-Matic controls, hydraulic-power steering and bonus horsepower that brings up a full dipper every pass.

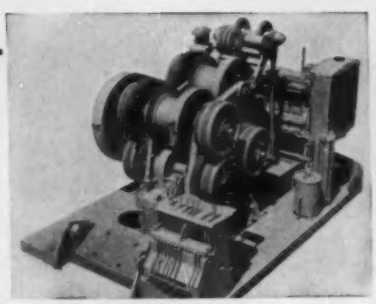
Increasing cycles per shift

Standard on every Link-Belt Speeder, Speed-o-Matic power hydraulic controls minimize operator fatigue. Response is fast, positive, precise

Exclusive with a Link-Belt Speeder, this true power hydraulic control system allows the operator to put his machine through its paces at the flick of the wrist. He's not subject to costly end-of-the-shift letdown . . . stays fresh, pushes his machine to its high limit throughout the shift.

Hydraulic-actuated clutches are self-compensating for heat and normal lining wear. Kick the engine over and go to work. There are no frequent stops for clutch adjustments.

It's advantages like these that put Link-Belt Speeder years ahead of the field — in productivity, in low maintenance and service costs. Start having your equipment dollars earning bigger returns. See your Link-Belt Speeder distributor now. Or write: Link-Belt Speeder Corporation, Cedar Rapids, Iowa.



MORE USABLE HORSEPOWER than other machines using the same make and model engine. Yet a Link-Belt Speeder remains well within the engine manufacturers' recommended operating speeds. It's possible because a Link-Belt Speeder is an extra-strength machine, designed and built to take full advantage of an engine's available power. This extra strength is evident in the size and quality of shafts, gears, clutches and structural members.

TRUE POWER HYDRAULIC CONTROLS—A Link-Belt Speeder exclusive, Speed-o-Matic power hydraulic controls, transmit pressure through oil directly to the clutches . . . eliminate over 150 wearing mechanical parts. Clutches engage smoothly, positively—without jerk, jump or lag. Oil is maintained at proper pressure by an engine-driven hydraulic pump.

It's time to compare . . . with

TX-321

LINK-BELT SPEEDER

Builders of a complete line of shovel-cranes . . . with exclusive Speed-o-Matic power hydraulic controls

. . . for more details circle 274, page 16

Equipment on the job... maintenance costs low

THAT'S THE REPORT wherever *Texaco Marfak* is used. *Marfak's* unique "sealing-in" action gives bearings lasting protection against wear and rust. Heavy loads and rough terrain won't jar or squeeze it out. With *Marfak,* equipment performance is always dependable, maintenance costs are low.

In wheel bearings, *Texaco Marfak Heavy Duty* seals out mud and moisture for thousands of extra miles—extends bearing life—assures safer braking. And no seasonal change is required.

If you prefer a multi-purpose lubricant, *Texaco Marfak Heavy Duty Special 2* is the answer. This new lithium-base lubricant handles chassis, wheel bearing, water pump and other grease lubrication. It pumps easily at low temperatures, always lubricates effectively, resists water washing and stands up in the toughest service.

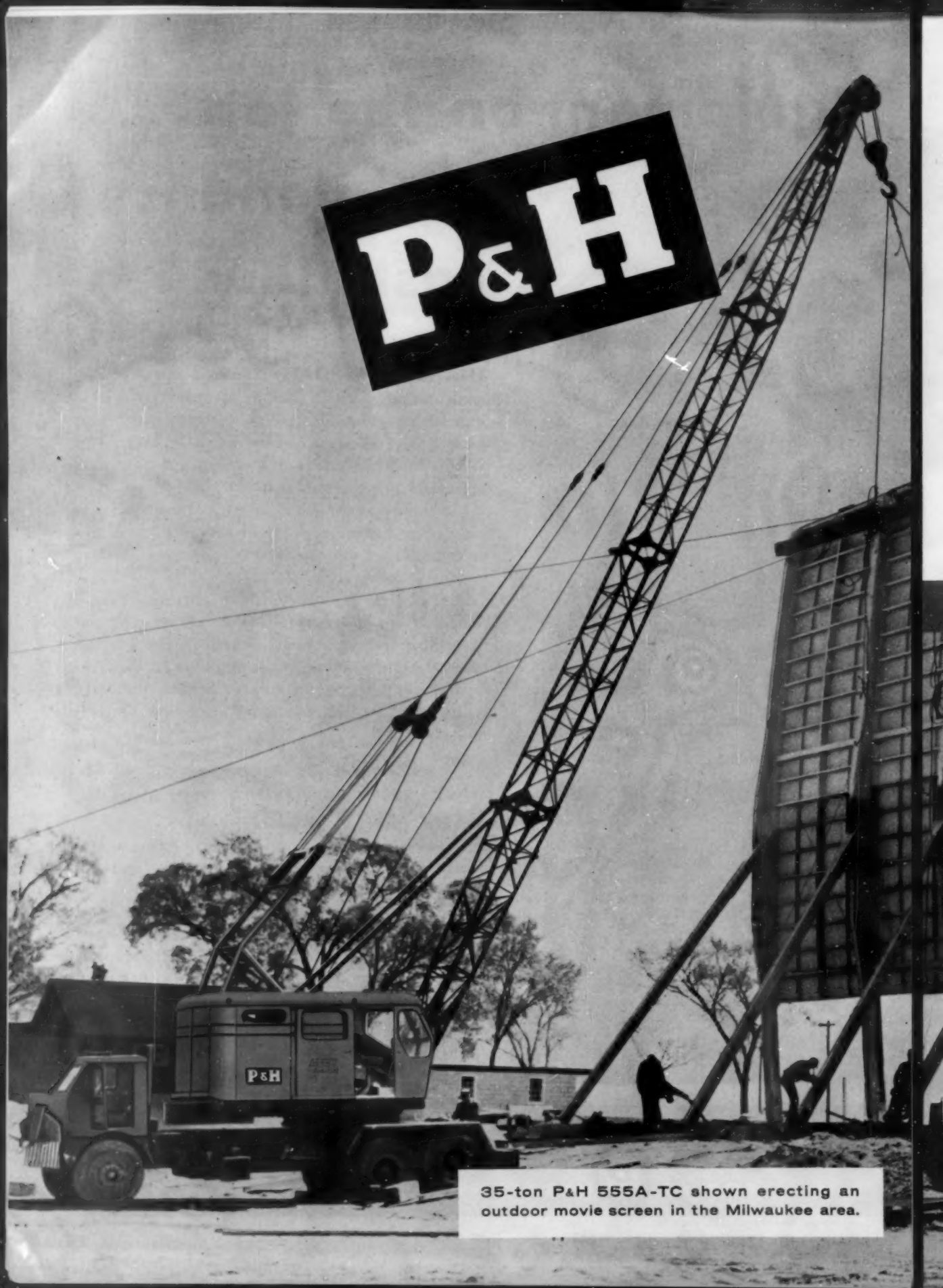
MORE THAN 650 MILLION POUNDS OF TEXACO MARFAK HAVE BEEN SOLD

And don't forget: Texaco Universal Gear Lubricant EP for smoother-working transmissions and differentials—*Texaco Track Roll Lubricant* to fully protect and prolong the life of crawler mechanisms.

Let a Texaco Lubrication Engineer help you boost efficiency, cut maintenance costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels
FOR ALL CONTRACTORS' EQUIPMENT

. . . for more details circle 251, page 16



35-ton P&H 555A-TC shown erecting an outdoor movie screen in the Milwaukee area.

Costs $89 a day...earns $160*

with 35-ton P&H "Job-Designed" Crane

In the 35-ton classification, there are more truck cranes with the familiar P&H trade mark than any other make—BY FAR! One reason for this unique acceptance is the fact that operators *know* P&H designs and builds both the upper and carrier expressly for 35-ton needs—giving owners a single source of responsibility.

An example of the P&H 555A-TC putting in more working days at a higher profit is the rig pictured at the left. Customers of the John Hennes Trucking Co., Milwaukee, Wis., keep this 555A-TC constantly on the go. Records show this machine costs $89.26 a day (depreciation excluded) to operate and it earns $160.

This profitable production is typical of P&H performance. It comes from such features as the P&H Planetary Boom Hoist. Lowering is always done under power and the boom can be safely held in any position. *The P&H Planetary Boom Hoist is a standard feature.*

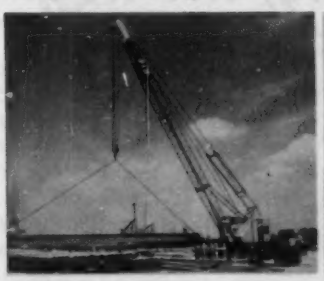
Another plus for P&H owners is the extra-strong booms supplied with the 555A-TC. Alloy steel and lattice construction makes these booms more rugged—and at the same time lighter. Goose-neck type, open-throat booms provide maximum boom load clearance.

Add to these exclusive features the famed P&H all-welded construction and live roller circle and you, too, will see why the P&H 555A-TC is the most popular truck crane in the 35-ton field. Call your P&H dealer. No matter what the capacity of your jobs, he can show you a P&H model to help you dig or lift more at a lower cost.

Harnischfeger Corporation
Construction & Mining Division
Milwaukee 46, Wisconsin

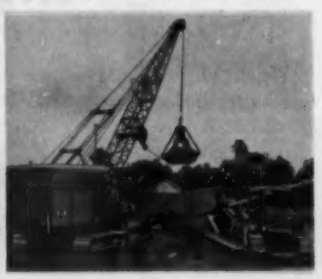
THE P&H LINE Truck Cranes: 8, 10, 15, 20, 25, 30, 35 and 40 tons
Shovels: ½, ¾, 1½, 1¾, 2½ and 3½ yards

Across the country P&H machines lead the field in power, speed, flexibility and profitable performance



TEXAS
For handling loads up to 20 tons profitably there is the P&H 255A-TC. Here is Brown & Root's third Model 255A-TC shown at work on construction of off-shore drilling platform at their Marine Division Shipyard.

CONNECTICUT
Earthmoving Service & Equip. Corp., profits from the greater strength of the 2½ yd. P&H 955A in moving tremendous quantities of borrow. Job is part of new Connecticut Turnpike.



VIRGINIA
In the ¾ yard class, Commonwealth Sand & Gravel Co. of Richmond depends on the speed and accuracy of the P&H 255A for increased production. It is shown here equipped with 40 foot boom and ¾ yard clamshell bucket.

. . for more details circle 226, page 16

*Write today for Verified P&H Cost-Performance Facts

Harnischfeger Corporation, Dept. 502-E
Construction & Mining Division
Milwaukee 46, Wisconsin

Gentlemen:
Please send me field report No. 5504 on the 35-ton P&H 555A-TC.

*Name*_____

*Title*_____

*Firm*_____

*Street*_____

*City*_____ *Zone*_____ *State*_____

Two NEW International BIG BONUS

with fast-loading, dirt-heaping, clean-

Now...all the advantages of famous International scraper design are available in two new towed scrapers —to turn big International crawler power and traction into *big-bonus yardage*. The new 20 cu yd heaped 4S-85 is matched in weight and capacity with the giant TD-24 to pile up profits on the fill. The 14-yard heaped 4S-55 is a cycle-speeder behind TD-18 heavy-duty pull!

Turn on International crawler power with one of these new scrapers—and watch the dirt boil in freely—compact itself into corners—build up an extra-yardage heap. These new scrapers have *flush-smooth* bowl interiors for *flow-easy* dirt action. You've never seen such fast, easy, big scraper loading! And outside-mounted apron arms insure super-speedy, load-trapping apron action!

Ground-hugging profile and low draft arm connections give these new International scrapers an amazing new load-heaping line of draft—plus greatly increased *all-speed* stability for rough-terrain hauling! Roll-out ejection assures fast dumping, and positive discharge of wet, sticky material!

Study the extra yard-getting features of these new big-capacity scrapers from the new balanced, easy-hitch tongue to the big-target push-block. Ask your International Construction Equipment Distributor for a demonstration.

INTERNATIONAL HARVESTER

INTERNATIONAL® Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

City_____ Zone_____ State_____

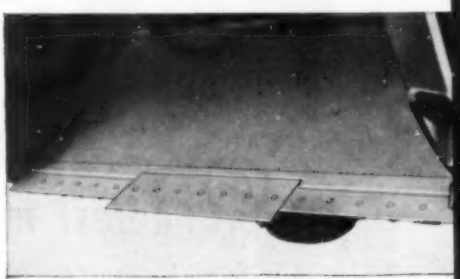
New fast-loading bowl design is obtained with a low rear apron contour that gives positive, built-in dirt-boiling action under all loading conditions. Even the wearbars protecting tilting floor hinge are blended into cutting edge bed—to insure smooth dirt flow!

YARDAGE

Scrapers

dumping design!

New cutting edge, where boiling action begins, consists of three equal-length, completely *interchangeable* and *reversible* sections. This design simplifies your parts inventory! And the cutting edge depth can be quickly changed to three different positions to match soil conditions and increase loading efficiency!



Exclusive power-saving double ball bearing sheaves maintain correct sheave alignment—provide increased cable and sheave life in these new scrapers. Below, it's the new 20-yard model "85" International scraper being self-loaded by a TD-24 crawler.

BRIEF SPECIFICATIONS:

Model	Recommended Tractor Size	Capacity Struck	Capacity Heaped	Capacity (with Sideboards) Struck	Capacity (with Sideboards) Heaped	Shipping Weight (Approx.)
4S85	TD-24	16	20	19	22	37,200
4S55	TD-18	10	14	12	15	26,360

Controlled, even spreading is accomplished by positive, power-saving roll-out ejection. High-lift apron, opened by ejector, eliminates excessive sheave travel and complicated reeving. All four axles of these new scrapers are individually replaceable, to minimize downtime, reduce repair expense! Below, the model "55" and TD-18 on the fill.

. . . for more details circle 299, page 16

KWIK-MIX 16-S DANDIE®

handiest mixer you've ever seen

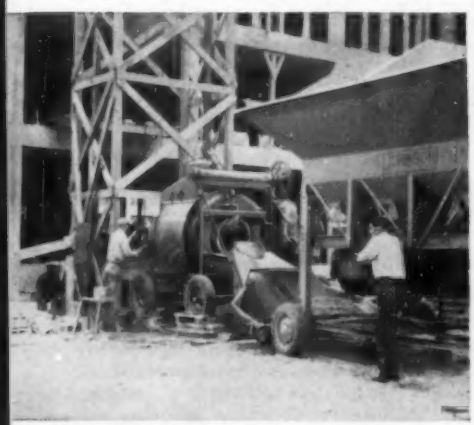
LOADS TRUCKS — Producing concrete for curbs and gutters, a Kwik-Mix 16-S Dandie mixer dumps batch directly into truck from ground level. Tower loader attachment gives 9 foot-2 inch discharge height. Big-capacity bucket holds full 17.6 cu. ft. mixer batch. It is powered by the mixer engine, dumps automatically at top of tower. Bucket travel and discharge are completed while the next batch is being

SETS UP AS CENTRAL-MIX PLANT — on bridge construction, two Kwik-Mix 16-S Dandie concrete mixers, with wheels removed, were set up side-by-side as permanent mix plants. Both were equipped with tower attachment for truck-loading operation. These big-capacity mixers also can be set up as stationary plants on elevated platforms by adding an extension track to charge the drum.

LOADS CONCRETE BUCKETS — Working on a state highway relocation project, this mobile 16-S Dandie mixed concrete for a series of box culverts — discharged batch into concrete bucket. To suit operating conditions, this versatile Kwik-Mix 16-S mixer is adaptable to side or end discharge. Axles are readily interchangeable on the square mixer frame. Change-over is easy, takes less than an hour.

KWIK-MIX COMPANY, Milwaukee 16, Wis. (Kwhring Subsidiary)

mixed. There's no delay to mixer production. Tower is easily attached. Top section is hinged, folds back for ample travel clearance. Tower loader attachment is also available on the 11-S Dandie concrete mixer, and on Kwik-Mix 10 and 14 cu. ft. bituminous mixers.



TEAMS UP WITH BATCHER — Concrete for a new apartment building was produced on the job by this Kwik-Mix 16-S mixer and Johnson Lo-Bin batcher — a low-cost, big-production team. (Other sizes in Kwik-Mix line include: 11-S, 6-S, 3½-S Dandie mixers.)

Also: Plaster-mortar mixers, bituminous mixers, Mate-Bags®

Johnson ⅜ to 3-yard Clamshell Buckets

Smooth inside and out, Johnson all-welded clamshells dig and dump with less resistance . . . give fast clean discharge. They're quick-filling, easy-closing, because big needle bearing-mounted sheaves reduce friction loss, deliver full digging power to cutting edge. Hard manganese edge, welded to heavy lips, toughens with use. 3 types, 10 sizes: ⅜ to 3 yds. Also check Johnson line of concrete plants, bins, batchers, hoppers, silos.

C. S. JOHNSON • Champaign, Ill.
(Koehring Subsidiary)

NEW 155 Trenchliner® is low and narrow

Small and compact, the working height on Parsons new 155 Trenchliner is only 7 feet-4 inches. Width over crawlers 5 feet-4 inches for work and travel in crowded areas. It digs up to 25 feet per minute — 16 to 26 inches wide, at depths to 10 feet. Has downcrowd boom, hydraulic control, "Tap-In" teeth, power-shift spoil conveyor. Available on flat shoes or grouser-type treads. Also — 6 other Parsons models, all sizes, types.

PARSONS • Newton, Iowa
(Koehring Subsidiary)

20-ton capacity with Koehring 405 Crane

With one of these heavy-duty 405's, you're equipped to lift any load up to 20 tons. Boom lengths range from 40 to 90 feet. For added reach, 15 to 30-foot jib can be used on any length boom up to 80 ft. Extra lift-capacity and stability increases the 405's work capacity with all attachments. Converts to 1-yard shovel or hoe, handles 1 to 1½-yard clamshell or dragline buckets on wide work radius. 4 other Koehring sizes also available.

KOEHRING Company
Milwaukee 16, Wisconsin

AE4

WHAT'S NEW in Equipment and Materials

Backhoe for Tractors

A completely new hydraulic backhoe for light tractors has been announced by Shawnee Manufacturing Co., Inc., 1947 N. Topeka Ave., Topeka, Kans. Named the "Warrior" the machine is designed for specific types of digging. It digs slightly more than 12-ft. below ground surface and has a full swing of 170° through three 120° quadrants of operation. Shifting from one quadrant to another can be performed from the operator's position. The new machine utilizes Shawnee's exclusive push-pull principle which produces digging power of over 4800-lb. at the bucket teeth. One hydraulic cylinder above the main boom pushes on an extension of the bucket boom synchronously. With the two cylinders providing push-pull force there is very little strain on the axis pin. Any or all of the hydraulic controls may be operated at the same time.

The new Shawnee "Warrior" is completely protected by an hydraulic bypass setting of 1400-lb. per square inch. The unit is designed so that the whole unit can be installed or removed from the tractor in a matter of minutes. Individually controlled hydraulic stabilizers align the unit for plumb digging on slopes, with the wheel on a curb, etc. The new unit is adaptable for mounting on all popular makes and models of light industrial tractors.

For more information circle 101 on Service Coupon this page and mail now.

Scraper Cutting Edges

An entirely new design in scraper cutting edges was introduced at the ARBA Road Show by Electric Steel Foundry Co., 2141 N.W. 25th Ave., Portland 10, Ore. This new product, known as the Esco ArcEdge cutting edge is exclusive with Esco and is stated to present an entirely new concept in the design of cast cutting edges not heretofore available. Feature of the new edge is its accurate curve which provides extra metal at the cutting edge. This extra metal actually forms a backbone supporting the cutting edge to resist abrasive wear. The ArcEdge design also provides a sharp edge to start and one which wears sharp.

For more information circle 102 on Service Coupon this page and mail now.

International Adds Two Power Units

Two new power units have been added to the line of the Construction Equipment Division, International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

The new four-cylinder units, termed the U-175 and the U-281, are available with equipment for operation on gasoline, LPG, natural gas, distillate, or kerosene.

The U-175 develops 50 h.p. at 2000 rpm on gasoline with a compression ratio of 6.8 to 1. Displacement is 175 cu. in. The U-281 produces 67.5 h.p. at 1800 rpm on gasoline with a compression ratio of 6.6 to 1. Displacement is 281 cu. in. Maximum torque of the U-175 is 146 lb.-ft. at 1200 rpm; and that of the U-281 is 234 lb.-ft. at 1000 rpm.

For more information circle 103 on Service Coupon this page and mail now.

Markers Use Radioactive Gas

What is stated to be the first commercial high brightness safety signals and markers to utilize the long-lived radioactive gas—Krypton 85—have been announced by United States Radium Corporation, Morristown, N.J. The signals and markers, designed especially for installations where power and maintenance are limited, employ treated phosphur crystals excited to luminescence by Kr85.

The devices, readily visible at distances in excess of 500 yd. are stated to be adaptable to a wide range of signal, directional and marking systems. Colors available include blue, green, yellow, pale orange and orange-red.

For more information circle 104 on Service Coupon this page and mail now.

More equipment news page 152

Concrete Breaking Tool

A new drill claimed to break concrete fast and without constant stopping for resharpening, has been placed on the markey by Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. Designed to direct the force of the impact, this tool is easy on the operator and will not stick, the manufacturer claims. Available in following sizes: 1⅛ x 6 in.; 1¼ x 6 in. Shank—14 in. and 18 in. length under collar.

For more information circle 105 on Service Coupon this page and mail now.

Electrical System Increases Battery Output

A line of alternator electrical systems, designed to provide increased battery output for over-the-road equipment used in the construction industry, has been announced by the Leece-Neville Co., 1374 East 51st St., Cleveland 3, O.

The new models are stated to be especially valuable where such accessories as flasher lights, two-way radio, spot lights, and the like, cause high battery draw, and where low travel speeds cannot provide sufficient recharging of batteries.

Models include both a light-duty unit and a heavy-duty unit, with capacities of 12 volts, 50 amperes. Also available are a light and heavy-duty model with capacities of six volts, 60 amperes.

For more information circle 106 on Service Coupon this page and mail now.

(Continued on page 152)

MAIL THIS COUPON TODAY!

ROADS & STREETS
22 West Maple Street
Chicago 10, Illinois

CIRCLE THE NUMBERS AND MAIL NOW!

Please send me further information on products and materials mentioned in the February Roads & Streets as circled below

About New Equipment and Literature:

101	102	103	104	105	106	107	108	109	110	111	112	113	114
115	116	117	118	119	120	121	122	123	124	125	126	127	128
129	130	131	132	133	134	135	136	137	138	139	140	141	142
143	144	145	146	147	148	149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180	181	182	183	184
185	186	187	189	190	191	192	193	194	195	196			

Further Information on Advertised Products:

197	198	199	200	201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220	221	222	223	224
225	226	227	228	229	230	231	232	233	234	235	236	237	238
239	240	241	242	243	244	245	246	247	248	249	250	251	252
253	254	255	256	257	258	259	260	261	262	263	264	265	266
267	268	269	270	271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290	291	292	293	294
295	296	297	298	299	300	301	302	303	304	305	306	307	308
309	310	311	312	313	314	315	316	317	318	319	320	321	322

Name_____ Title_____

Firm or Gov't. Dept._____

Street_____

City_____ State_____ 2-57

NOT GOOD AFTER MARCH 15, 1957

A READER SERVICE FOR YOUR NEEDS

more power...

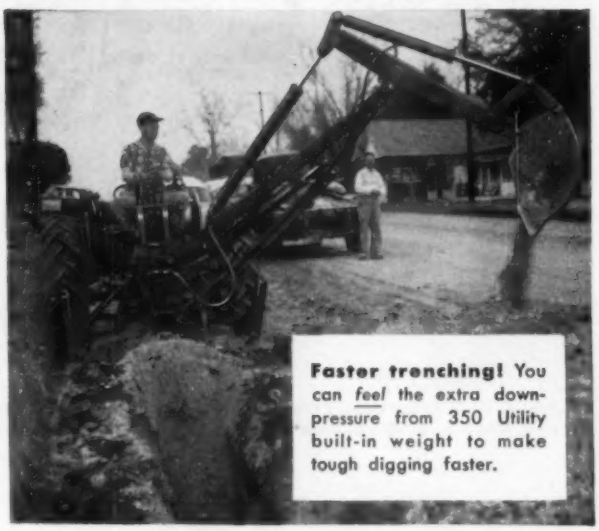
plus traction for every footing!

Sock a big loader bucket into a hard-packed pile! Feel the stepped-up power of the new International® 350 Utility tractor! See how a half-ton greater built-in weight knuckles in to give you traction for the big bites. See how big-diameter pneumatic tires provide full-load flotation . . . even on soft dirt or slick concrete.

Back out fully loaded! Let power steering help you turn sharp with a light touch of one hand. Your other hand is free to control the 1,500-pound loaded bucket high overhead. With power steering, you save time on every pass—cut costs every hour.

Tough going? Don't shift! Just pull the Torque Amplifier lever to boost pull or push-power up to 45%, *on-the-go.*

So try it! Call your IH dealer for a free demonstration on your job. Give him an opportunity to prove the International 350 Utility gives you extra power teamed with extra weight and stamina to outwork them all!



Faster trenching! You can *feel* the extra down-pressure from 350 Utility built-in weight to make tough digging faster.

SEE YOUR INTERNATIONAL HARVESTER DEALER

International Harvester products pay for themselves in use—McCormick Farm Equipment, Farmall and International Tractors . . . Motor Trucks . . . Construction Equipment . . . General Office, Chicago 1, Illinois

. . . for more details circle 229, page 16

"Bit cost so low with TIMKEN® multi-use rock bits it's hardly an item"

...says Acme Construction Co.

LOCATION: By-Pass State and Federal Project, U. S. Route #52, Welch, West Virginia.

OPERATING CONDITIONS: Soft shale to very hard sandstone.

FOR precision drilling in mountain-side formations from soft shale to very hard sandstone, Acme Construction Co. of Beckley, W. Va., used only one size of Timken® multi-use bits. With controlled distribution of reconditioned bits, Acme got a bit cost so low they barely consider it an item.

Driller after driller gets similar savings. With correct and controlled reconditioning, Timken multi-use bits give the lowest cost per foot of hole when full increments of steel can be used in ordinary ground.

But they may not be the best answer for *all* your drilling problems.

When you drill in hard, abrasive ground, you get higher speeds and greater economy by switching to Timken carbide insert bits. They're your best bit for extremely deep holes, constant-gauge holes, small diameter blast holes.

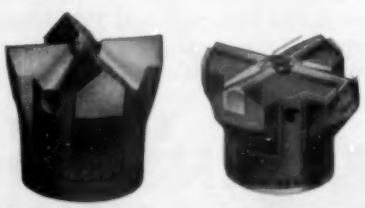
Timken multi-use and carbide insert bits are important time-savers when your drillers change bits. They're interchangeable in the same thread series. And dozens of different Timken bits fit the same drill steel. Bits can be changed right on the job.

All Timken bits are made from Timken fine alloy steel and have special shoulder unions to protect the threads from drilling impacts. We're the only removable rock bit manufacturer that makes its own steel. We do it to control quality at every step of the way. To find out which bit will save the most and do the best job for you, call on Timken Rock Bit Engineering Service. Write: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

your best bet for the best bit... for every job



Timken threaded multi-use rock bit | **Timken threaded carbide insert rock bit**

... for more details circle 287, page 16

ROADS AND STREETS
Sixty-Four Years of Editorial Leadership

Washington News Letter

By Duane L. Cronk

February 10, 1957

A Congressional Committee took a quick look at progress of the National Highway Program last month and aired some views worth noting for future reference. Their inquiry gave Federal Highway Administrator John A. Volpe opportunity to review the accomplishments of the first six months under the multi-billion-dollar highway act.

To illustrate how quickly the program is being brought to the construction stage, Mr. Volpe pointed out that:

- Over $1.5 billion was obligated for roadbuilding in 1956, compared to $850 million in 1955 and $675 in 1954.

- Of this amount $1.1 billion has been obligated in the last six months alone, an amount greater than total sum obligated in the 12 months of 1955.

- 55% of the 1957 apportionment has already been obligated by the states, compared to the 38% of 1955 funds obligated in the first six months of that year.

- $905 million worth of work has been started on the Interstate System, of which $286 million worth is under construction, $185 million worth is ready for contract letting and $350 million worth is past the right-of-way acquisition stage.

* * *

The federal official declared that "outstanding progress" has been made, in spite of repeated criticism by Senate Subcommittee Chairman Albert Gore that "there has been a definite tardiness in getting this program under way." Mr. Volpe admitted that although six states have already obligated all of their 1957 funds, sixteen states have obligated less than 25% of the federal aid available to them. But he insisted that almost all the states will have committed their 1957 money by June 30.

The Senators wanted to know also if the Bureau of Public Roads has experienced instances of collusion among bidders, if the labor provisions are being enforced and if public hearings are being held on route locations. Senator Gore warned that the committee will keep a wary eye open for any evidence of collusion, now a federal violation on federal-aid road work.

* * *

The roadbuilding industry is nowhere near its peak capacity yet, representatives of the American Road Builders' Association assured the Senators. "I see no reason to raise a single serious question about the contractors' capacity," Executive Vice President Louis W. Prentiss testified. He noted, however, several

administrative short cuts which would make the contractors' job easier. He urged state highway departments to:

- Speed up partial payments. Make necessary adjustments in routine.

- Limit retained percentages of 10% to payments on the first 50% of the job only. "When half the work has been successfully completed, no additional retentions are necessary to protect the state," he said.

- Use aerial photography to compute final quantities and eliminate the 60-90 day delay in paying contractors' final vouchers.

- Write more specifications for results, rather than methods. He noted the plight of one manufacturer who has developed a paving machine capable of paving at "almost double the speed" provided in current specifications. He should not be required to demonstrate the machine in every state, General Prentiss said. "If satisfactory performance is demonstrated on a federal-aid project in any one state, the Bureau of Public Roads should be able to authenticate this performance to all states."

- Eliminate the current requirement that contractors on Interstate projects submit weekly payrolls to the Department of Labor for audit against approved wage rates. He called this "an unnecessary and expensive administrative burden."

A committee of county officials should be named as advisors to the BPR, the ARBA official said, to make sure that local roads problems are not neglected in the haste to construct the Interstate System. Such a group could help coordinate work on state and county systems.

* * *

The Senators pondered several other modifications to the 1956 Highway Act - whether to expand the Interstate System beyond 41,000 miles and whether to prohibit billboards along the network. It was apparent that considerable pressure is being exerted to add mileage to the Interstate System. W. A. Bugge, president of the American Association of State Highway Officials and Washington state highway director, outlined the AASHO position against adding new mileage to the network until the 41,000 miles already designated have been constructed, but admitted that his state has requested 50 miles more and that all state requests add up to 12,500 miles.

* * *

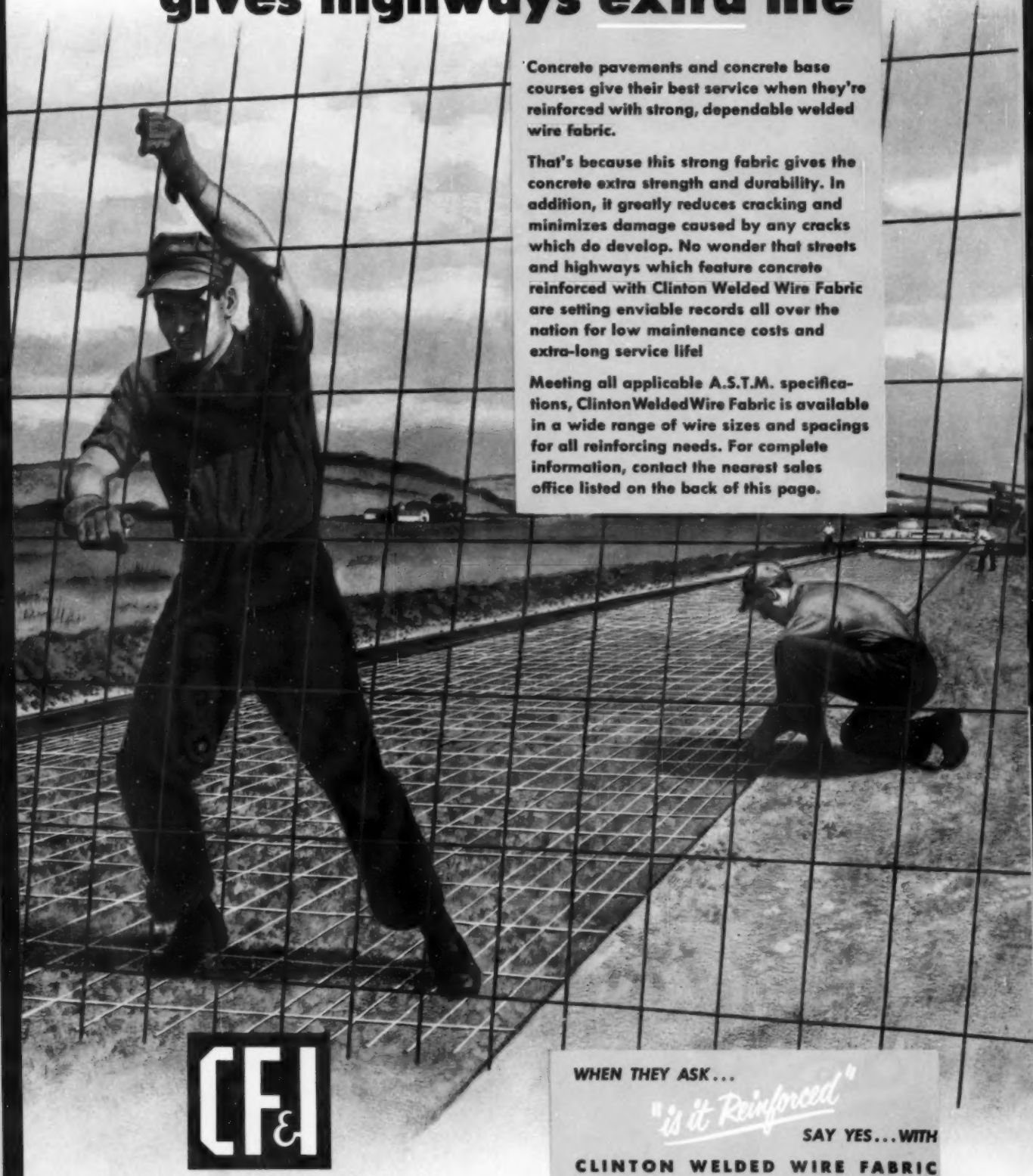
Uniform traffic laws must be adapted by all states and cities as a major measure against highway accidents, a House subcommittee said last month, after an investigation of accident causes. "The price this country needlessly pays every year for this chaotic disparity in traffic laws is a high fatality and injury toll, uncounted economic waste and a tremendous loss of efficiency in traffic movement." The committee deplored also the confusion of traffic signs, hit-and-miss safety programs and the excessive speed and horsepower of late model automobiles. (There is increasing sentiment among Congressmen that automobile manufacturers must become as concerned about the safe design of the vehicle as highway engineers are concerned about the safe design of the road.)

* * *

As this goes to press, an estimated 50,000 visitors are in Chicago for the Road Show. This show and convention will be reported in next month's Roads and Streets.

CLINTON WELDED WIRE FABRIC

gives highways extra life



Concrete pavements and concrete base courses give their best service when they're reinforced with strong, dependable welded wire fabric.

That's because this strong fabric gives the concrete extra strength and durability. In addition, it greatly reduces cracking and minimizes damage caused by any cracks which do develop. No wonder that streets and highways which feature concrete reinforced with Clinton Welded Wire Fabric are setting enviable records all over the nation for low maintenance costs and extra-long service life!

Meeting all applicable A.S.T.M. specifications, Clinton Welded Wire Fabric is available in a wide range of wire sizes and spacings for all reinforcing needs. For complete information, contact the nearest sales office listed on the back of this page.

CF&I

WHEN THEY ASK...

"is it Reinforced"

SAY YES...WITH

CLINTON WELDED WIRE FABRIC

THE COLORADO FUEL AND IRON CORPORATION · DENVER · OAKLAND · NEW YORK

CLINTON WELDED WIRE FABRIC

gives concrete pipe extra strength

You can install maintenance-free pipe systems if you use concrete pipe reinforced with welded wire fabric. That's because this product combines concrete's natural resistance to corrosives with the extra strength of cold-drawn carbon steel wire. The result is a pipe that's hard to beat for dependability and long service life.

So—whether yours is a new project or a replacement job—get the pipe that'll give permanent, efficient, maintenance-free service. Specify concrete pipe that's reinforced with Clinton Welded Wire Fabric.

Meeting all applicable A.S.T.M. specifications, Clinton Welded Wire Fabric is available in a wide range of wire sizes and spacings to meet every requirement. For complete information, contact the nearest sales office listed below.

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CANADIAN OFFICES AT: Calgary • Edmonton • Vancouver • Winnipeg

More proof that CAT* LOWBOWL Scrapers deliver bigger, faster loads

Handling tough material on the Florida Turnpike, a new DW21 (Series C) Tractor-No. 470 LOWBOWL Scraper averaged 128 pay yd. an hour on a 6900-foot round trip

RESULTS OF FLORIDA TURNPIKE JOB TEST

JOB AND LOCATION: Building 3.8 miles of new road on Florida Turnpike, near Hollywood. The job involves moving about 1,000,000 cu. yd. of sand. The contractor: Troup Bros., Inc., Miami. **CONDITIONS:** *Material*—very fine, loose white sand with an estimated shrinkage of 25%, borrow to compacted. *Loading*—D9 (Series D) Tractor with torque converter used for pusher. *Haul distance*—3250 feet over loose to damp, compacted sand, maintained by a No. 12 Motor Grader. Rolling resistance, 100 lb./ton. *Return distance*—3650 feet. *Grades on haul*—400 feet of 1°-3° adverse and 600 feet of 1°-2.2° adverse.

TIME STUDIES

AVERAGE	DW21-No. 470 LOWBOWL Scraper
Load time	.44 min.
Haul time	3.33 min.
Haul speed	11.14 MPH
Spread and turn time (180°)	.38 min.
Return time	3.37 min.
Return speed	12.31 MPH
Wait time	.39 min.
Total cycle time	7.91 min.
Trips per hour	7.59
Pay yd./trip	16.8
Production pay yd./hour	128

REMARKS: The loose, fine sand was difficult material to load. In spite of this, average loading time was excellent, due to the fast-loading characteristics of the new No. 470 LOWBOWL Scraper. Average cycle time was excellent, too—a reflection on the new DW21's Turbocharged power and wide-base tires!

Recent tests on the Florida Turnpike confirm previous reports from other jobs in Iowa, Kansas and New Jersey—the new Caterpillar LOWBOWL Scraper steps up production with bigger, faster loads. Here's proof again that on the job, where results and only results pay off, the new LOWBOWL design delivers a new high in money-making performance.

Says Donald R. Grubbs, Superintendent for Troup Bros., Inc., Miami: "I like the wide-base tires on this new DW21—they help us over this sandy fill. The new LOWBOWL Scraper design also cuts down our loading time. What's more, we've had very little down time with our Caterpillar equipment."

Before you make your next bid, get the full facts about the new LOWBOWL Scrapers. Your Caterpillar Dealer's salesman carries completely documented details about their productive capacity on this and other jobs. Ask him to show them to you!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

. . . for more details circle 207, page 16

The new two-wheel Cat DW21-No. 470 LOWBOWL Scraper. A new four-wheel DW20-No. 456 LOWBOWL Scraper is also available. Both units have a capacity of 25 cu. yd. heaped; 18 cu. yd. struck. Both feature the new Turbocharged, 6-cylinder Cat Engine which delivers 300 HP (maximum output) and 10% more rimpull. New LOWBOWL design loads more material with less resistance clear to the end of the loading cycle. Wide-base tubeless tires, now standard equipment, eliminate an estimated 80% of down time caused by tires.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

BIGGER, FASTER LOADS WITH CAT LOWBOWL SCRAPERS

Our February Cover

This picture, which trails a feature article in December Roads and Streets, shows some of the rock drilling equipment employed by Slattery Contracting Company, Inc., Maspeth, L.I., on their heavy grading section of the Connecticut Turnpike.

The compressor is a new Jaeger 600 CFM rotary unit. The drills are Chicago Pneumatic Tracdrils. Equipment shown is part of a working spread consisting of 3 Tracdrils, supplied by the Jaeger compressor and one other compressor, the latter not pictured.

This photograph eloquently portrays the trend toward heavier and larger compressors and drills on highway rock work, required to keep pace with the larger shovels and wagons also commonly seen these days.

Labor Importation Questioned on Illinois Turnpike Job

The federal grand jury in Chicago has been investigating labor practices on the first contract section of the $415 million Illinois Toll Road program. This $3 million contract was awarded in September to Public Construction Co., Inc., Camden, N.J., covering a 4.4 mile section near Rockford.

The probe was aimed at determining whether there is any violation of the Hobbs Law, better known as the "labor anti-racketeering act." News of the investigation broke early in October, when an executive of the contracting firm went before federal judge Philip Sullivan in Chicago, seeking to quash a subpoena to bring company officers and records before the grand jury.

The Hobbs act covers labor as the Sherman anti-trust act covers commerce, noted Hal Foust in the *Chicago Tribune's* account of this development. The law forbids restraint in employment. Illinois union leaders reportedly have been questioning the company officials about the number of workers they planned to import from New Jersey for the project. The contractors characterized the jury action as a "fishing expedition," and said that the jury appearance might result in hampering the firm in entering bids for other toll road contracts coming up.

Public Constructors, Inc., bid on but failed to get the second toll road contract award, for which Ryan Construction Co., Evansville, Indiana, was lowest of 17 bidders at $2,278,000.

everywhere a MACK goes

...there are MACK parts

...there's MACK service

Mack trucks can be serviced through 56 Direct Factory Branches and nearly 300 Distributors.

- ★ **parts in a hurry**
- ★ **reduced inventory stocks**
- ★ **the proper tools for the job**
- ★ **Mack service experts**

To assure you of the ultimate in parts and service—no matter what year or model Macks you operate—Mack has worked out a smoothly operating program for *direct action* service and supply.

First, your local MACK DISTRIBUTOR carries a carefully balanced stock of parts essential for his own local operation.

Next, the local MACK FACTORY BRANCH maintains a full inventory of parts, and stands behind every distributor for immediate on-call service. The branches are fortified by complete parts and accessory inventories maintained in MACK'S DIVISIONAL DEPOTS.

Finally, there's MACK PARTS HEADQUARTERS—Mack's huge spare parts center at Somerville, N. J., with 423,000 sq. ft. of parts—over 60,000 different items and assemblies, totalling millions in number. There is virtually no Mack part that is not available through Somerville. Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd.

***For emergencies — practically any Mack part in 24 hours!** The huge inventories and streamlined replacement service of the Somerville, N. J. Mack Parts Headquarters stand squarely behind every Mack truck ever built.*

MACK
first name for
TRUCKS

4590

. . . for more details circle 292, page 16

These Fundamentals Will Speed Your Snow Plowing

By E. C. Gledhill

General Manager, The Gledhill Machinery Co.

THERE are very few people who realize what it costs to keep roads and streets open in the snow storms and wind storms. The wind has the same effect as the snow in blocking highways.

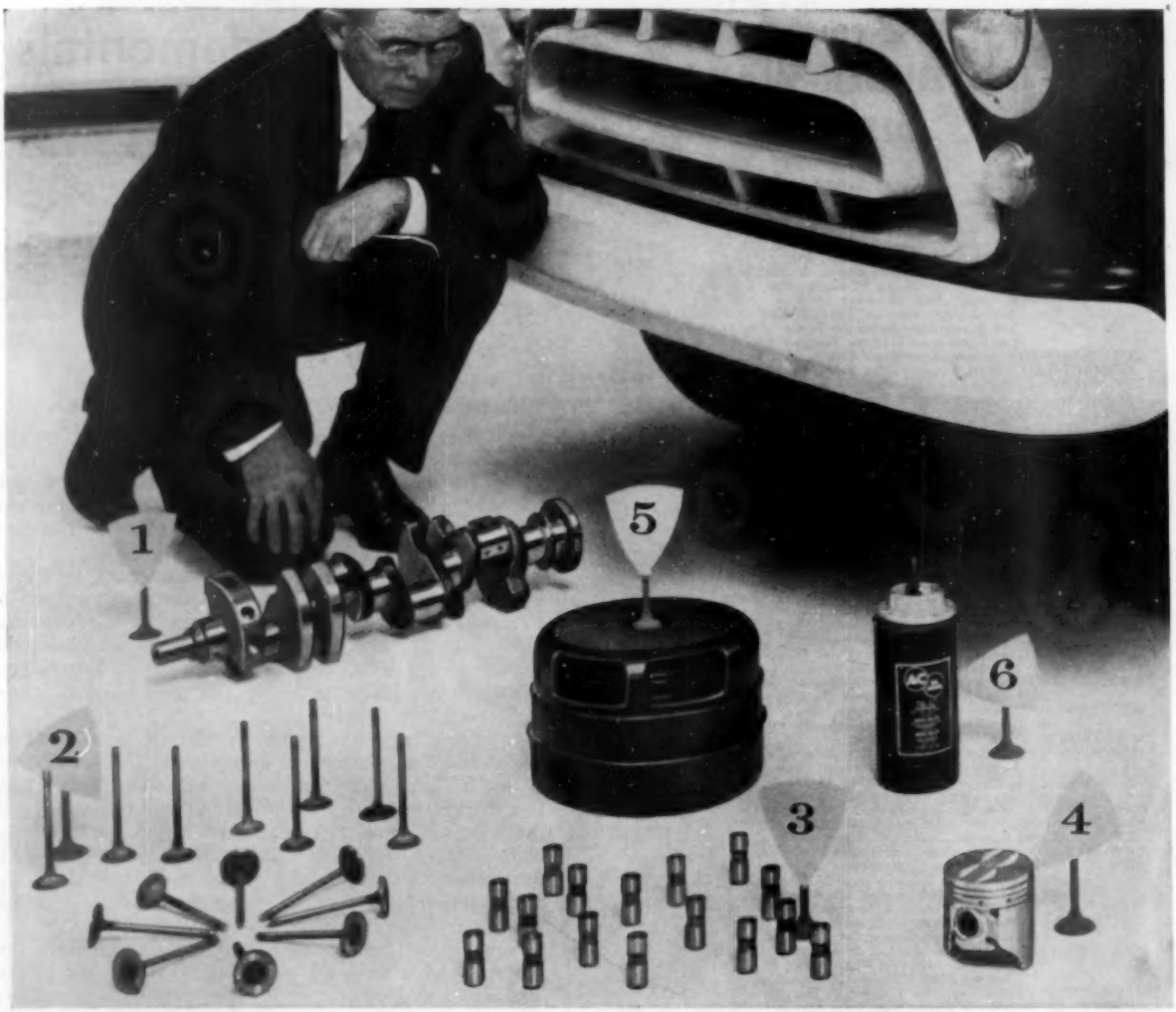
When we have a fairly heavy snow, the plow crew goes to work and clears the snow off as fast and as cheap as they can. Next day, we have a wind and the roads become blocked again. The wind flows the snow and blocks the roads, making drifts. It stops traffic. It is a big problem and there is a lot to be learned on how to do it "quick and cheap."

One very important feature is that the snow plow to use should have the proper curvature on the moldboard, so that it throws and rolls the snow off of the roads. There is a proper curvature moldboard that will roll and throw the snow and move twice the amount of snow off of the highways compared with moldboards not properly shaped. Poorly designed moldboards scrape the snow off of the roads by sliding the snow along on the moldboard so that it falls off of the rear end.

Now, if the moldboard is properly shaped, and the proper speed is used, the snow can be thrown off of the road and rolled off in two or three times the quantities with the same amount of power, and the snow will move three to four times as far—often completely out of the way. With the old shaped moldboard, it costs about three to four times as much to clear the road.

(Continued on page 32)

● Unretouched picture shows how the snow is rolled and thrown by a properly shaped moldboard.



LOW HAULING COSTS COME RIGHT

Many of the things that make a Chevrolet truck more economical to run are seldom seen by the owner. They're hidden features, deep in the truck's design. Here are just a few of them, to prove a Chevy's engineered better and built better for bigger savings!

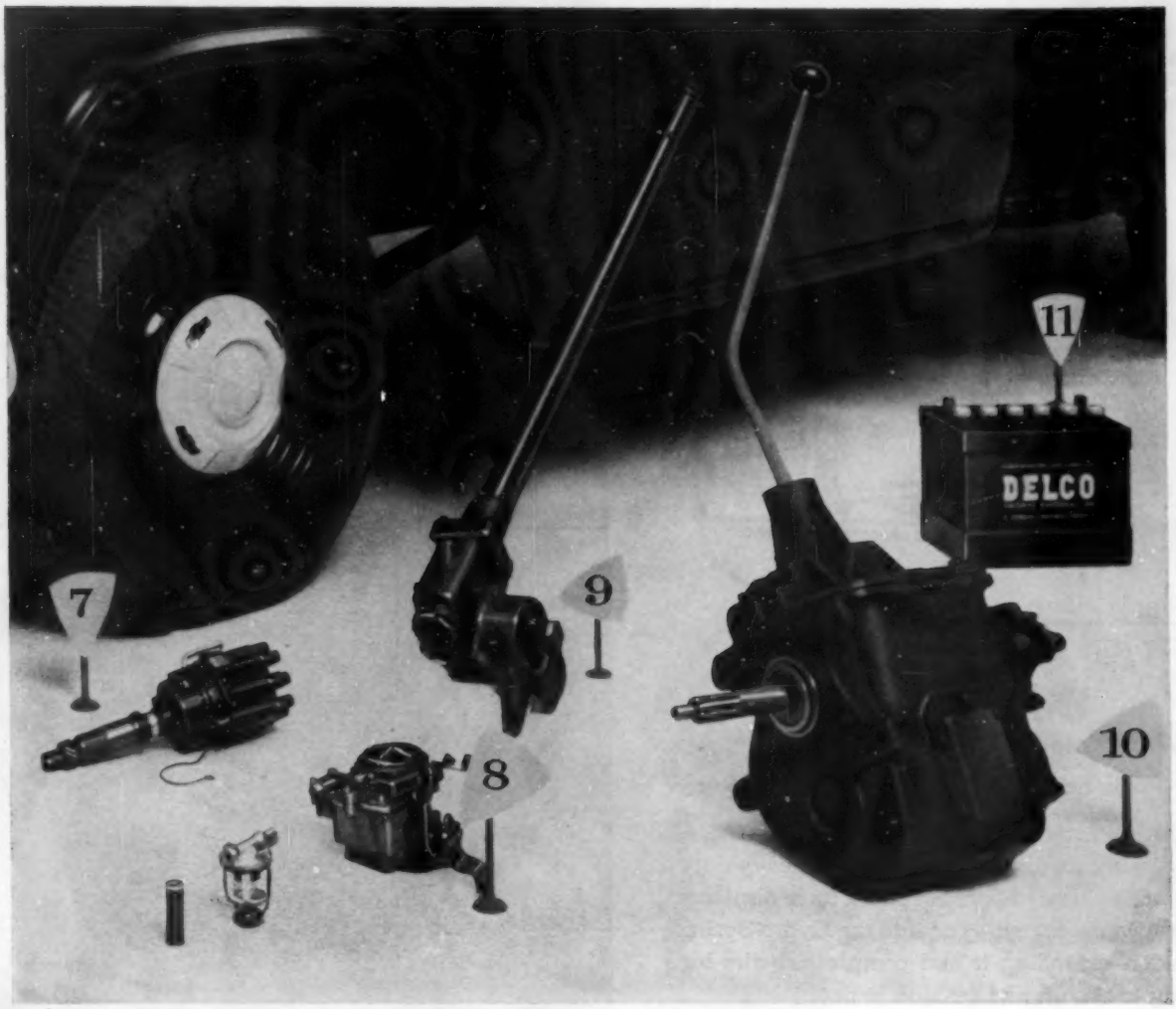
1. *Forged steel crankshaft*—It's extra sturdy, precision machined and balanced, the foundation for dependable, long-lasting power!

2. *Aldipped exhaust valves**—Special aluminum treatment on valve surface protects valves against pitting; engine wears less, costs you less to run!

3. *Hydraulic valve lifters*—for longer valve life in V8's, fewer engine repair jobs.

4. *Chevy V8 piston*—Thanks to *short-stroke* V8 engine design, this piston travels a shorter

1957 CHEVROLET TASK·FORCE TRUCKS



FROM THE "HEART" OF A '57 CHEVY

distance, wears less. Short-stroke efficiency aids fuel economy, too!

5. *Oil-bath air cleaner—standard* on all Chevrolet truck engines for added protection against dust and foreign matter that shorten engine life.

6. *High-capacity oil filters***—They remove dirt particles from Chevy engine oil to cut engine wear and maintenance.

7. *Easy-adjust distributor points*—You can adjust this new Chevy V8 distributor *with the engine running;* it's added insurance against the down time that costs you money.

8. *Multiple fuel filters*—For *clean* fuel, all Chevy engines have fuel filters in the carburetor and fuel tank; in addition, V8's provide an *extra* filter at the carburetor.

9. *Ball-Gear steering mechanism*—Inside this steering gear scores of polished steel balls virtually eliminate friction. Less friction means less wear, less maintenance!

10. *Rugged manual transmission*—Synchro-Mesh design eliminates the need for double-clutching, reduces costly wear. Gears are shot-peened for extra strength.

11. *12-volt battery*—provides sure starting, good ignition, long battery life in all Chevrolet trucks.

And there are dozens of other equally important reasons why a Chevy truck costs less to run! See your Chevrolet dealer for all the dollar-saving facts.... Chevrolet Division of General Motors, Detroit 2, Michigan.

**On Thriftmaster 6, Trademaster V8.*
***Standard on V8's and Jobmaster, optional on Thriftmaster 6.*

PROVED ON THE ALCAN HIGHWAY . . . CHAMPS OF EVERY WEIGHT CLASS! CHEVROLET

. . . for more details circle 222, page 16

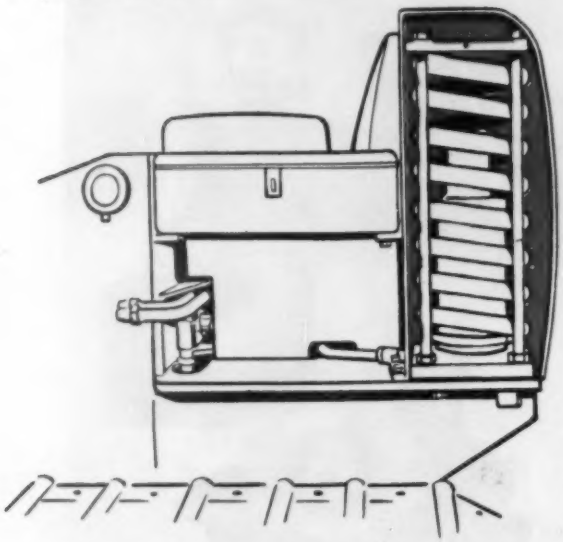
HOW CAPACITY-

. . . shock-

stops hose-bursting,

When you're semi-skidding heavy bucket-loads of material over rough terrain, and the skid-shoes contact a high spot abruptly, linkage isn't pounded—and your spine isn't mauled! *Shock-swallowing Hydro-Spring takes over. No pain—no strain!*

Exclusive Hydro-Spring reduces the effects of shock forces by an actual 67%, or more. Only International Drott gives you Hydro-Spring advantages.



How patented Hydro-Spring increases equipment life and capacity

Exclusive International Drott Hydro-Spring is a hydraulic cylinder enclosed in a heavy-duty *locomotive-type* coil spring. Shock force displaces oil from main lift cylinders into the Hydro-Spring cylinder—extending it and compressing the big spring to absorb and cushion impact loads.

Owners declare that Hydro-Spring adds a whopping 25% to loader and tractor life—besides reducing downtime and boosting production!

Try Hydro-Spring, turned on and off, to prove a vital money-making difference between International Drott and unprotected front-end loaders! Measure the job-getting, yard-adding advantages of exclusive triple-power, pry-action break-out and other International Drott exclusives. And see how you can beat a fleet of limited-duty rigs with an *exclusive* Four-In-One. See your International Drott Construction Equipment Distributor for a demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL®
DROTT®

ADDING, swallowing Hydro-Spring

frame-mauling, spine-smacking impact!

When you solidly set the Skid-Shovel or Four-In-One in tough material to apply famous bucket-heaping, pry-action break-out, you don't punish the equipment, or yourself. *Shock-swallowing Hydro-Spring takes over—intercepts "slam-bang" bumps!*

When you're using the Four-In-One in dozer position and plow into tough material like this hard-frozen soil, you don't overload hose connections with a tooth-jarring crash. *Shock-swallowing Hydro-Spring "gentles" trouble-causing forces by two-thirds, or more.*

When you dump a bucketful of rock in one sudden clatter, don't brace for a bump, or expect something to break loose. *Shock-swallowing Hydro-Spring cushions impact, thus cuts time loss, and practically eliminates hydraulic hose failures.*

. . . for more details circle 300, page 16

Snow Plowing

(Continued from page 27)

We all realize that snow fences will stop the snow and keep it from drifting on the highway. That is a big saving because the snow doesn't get on the highway and have to be moved.

I am coming to the point that I have learned over a period of years, i.e., how another big saving can take effect and can be accomplished. First, throw the snow with the wind. Make your drift on one side of the road in a way that the snow will blow over the highway and drop into the space beyond where you have made your drift, and off of the highway. If you make a drift on the wrong side of the road, you are building a snow fence. Wind will carry the snow up to that point, over the top of the drift, and drop it in the highway, and it would have to be removed again.

If this feat is practiced, millions of dollars can be saved per year in keeping the roads open.

In conclusion, see that the shape of the moldboard is such that it will roll and throw the snow, not scrape it. Don't build a drift which acts like a snow fence and drops the snow into the highway. This is worth knowing. The snow plow operator should practice this so that, when the roads are open, they will stay open until another snow.

There are good snow plows and there are poor ones. There are good operators and there are poor operators running the snow plow. There are millions of dollars spent inefficiently because of the two.

Job safety developments

Two steps of considerable interest in the field of job accident prevention were taken in Virginia recently, where the Safety Committee of the Virginia Road Builders Association has worked closely with a similar committee in the Virginia Department of Highways and Department of State Police.

- The portable "Men Working" and "25 Miles Speed Limit" signs, required on state highway work, be picked up or turned over when there are no men working. This is advocated to help insure that motorists take these signs seriously.

- The Virginia Department of Highways expects to conduct a series of schools for flagmen during the present winter months.

Contractors have been invited to send flagmen, foremen and superintendents.

This Skyscraper grew on MM ENGINE BEEF

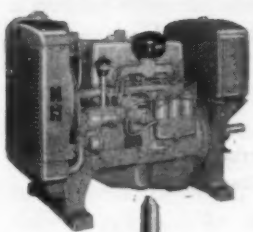
Powering a 3-drum American hoist, this Minneapolis-Moline 605-6A Engine boosted a small mountain of materials to build this skyscraper. Lifting up to 350 loads a day, the hoist handled more than 12,000 tons of building materials, 1,500 tons of debris, thousands of feet of lumber, and huge quantities of millwork, glass and paint. The job was the second big project on which the hoist had worked without general overhaul.

Big displacement and high compression for high torque at moderate rpm are built-in advantages of MM Industrial Engines—make possible operation under constant or intermittent loads at low fuel and maintenance costs. Vacuum crankcase ventilation and by-pass cooling minimize oil dilution and cylinder distortion, chief causes of engine wear. Exclusive MM removable cylinder blocks and heads allow virtual renewal of engine in the field, at low service and parts cost.

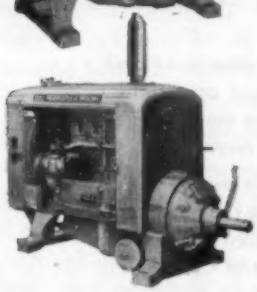
MM Industrial Engines are furnished as fan to flywheel, bare engine, heat exchanger or radiator equipped, or enclosed power units. A wide selection of torque converter accessory, modification, and final-drive equipment is available. Send details on your application for examples of MM built-to-order packages for original or replacement needs.

MM
MINNEAPOLIS-MOLINE

INDUSTRIAL ENGINES



MM DIESEL ENGINES
Four and six-cylinder MM diesel engines are available in sizes from 283 to 605-cubic-inch displacement. Energy-cell combustion and husky part size offer high fuel efficiency . . . low maintenance expense.



MM CARBURETED ENGINES
Four and six-cylinder MM carbureted engines are available in sizes from 165 to 800-cubic-inch displacement with factory-engineered fuel systems for gasoline, LP gas, natural gas, or distillate fuels.

The **GOLDEN** *POWER LINE*

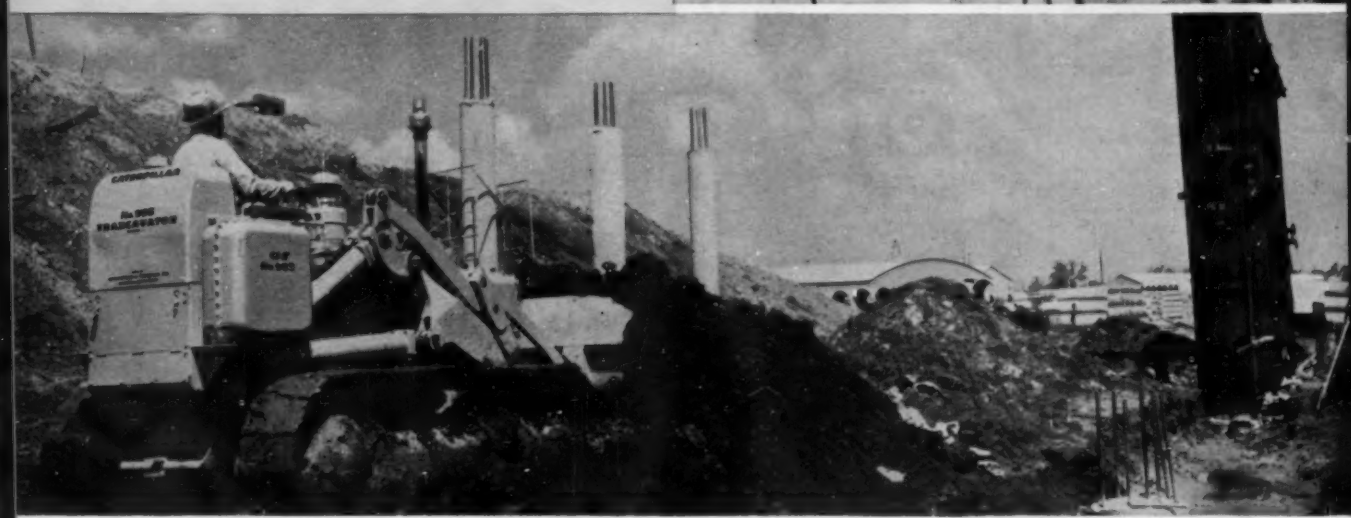
MINNEAPOLIS-MOLINE

INDUSTRIAL POWER DIVISION • MINNEAPOLIS 1, MINNESOTA

. . . for more details circle 241, page 16

"ONE DEMONSTRATION OF THE NO. 955 TRAXCAVATOR* AND I WOULDN'T LET THEM TAKE IT BACK!"

F. V. Minor, Dallas, Texas



F. V. Minor had a subcontract from Austin Bridge Co. to dig bridge abutments and clean up dirt along a railroad overpass retaining wall west of Dallas. The earth was packed hard and when he tried to use a loader of another make, he found the machine just couldn't get into it.

Then the Caterpillar Dealer brought a No. 955 Traxcavator out to demonstrate. And once he'd seen how it did the work, Mr. Minor wouldn't let them take it away. A lot of other contractors know just how he felt. The Caterpillar No. 955 Traxcavator has been a success from the day it was introduced. It really licks the tough jobs.

This fast, efficient excavator-loader has a 1½-cu.-yd. bucket, 80 inches wide. A dependable 70 HP CAT* D315 Engine gives it plenty of digging power in tough materials. The bucket has full 40-degree tilt-back at ground level to prevent spillage, and 128-inch lift height for easy loading.

Operators like the No. 955 for its exceptional visibility and fast-acting hydraulic controls. Bucket lift and tilt levers are positioned for easy one-hand operation. And the exclusive Caterpillar oil clutch adds to long work life and reduces maintenance.

If you've got a difficult excavating problem, ask your Caterpillar Dealer to demonstrate a Cat-built Traxcavator right on your job. In addition to the No. 955, he can show you the No. 933 (1 cu. yd., 50 HP) and the No. 977 (2¼ cu. yd., 100 HP). He'll prove to you that they're built to do more work and harder work at lower cost. You can count on him, too, for prompt, reliable service and parts you can trust. Talk to him today.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

. . . for more details circle 208, page 16

REO Super-V

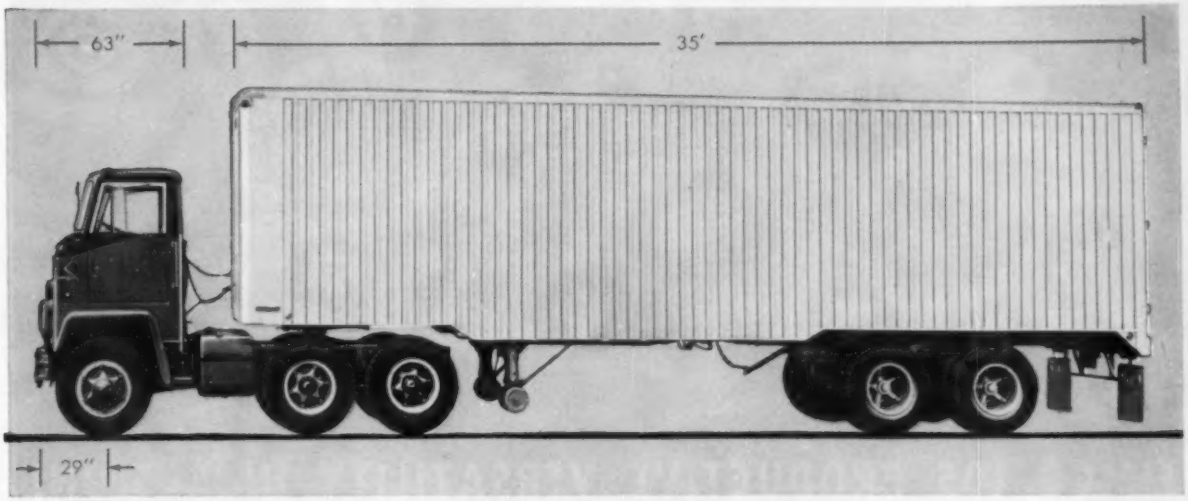
Only New COE Completely Designed For

You're looking at the industry's first complete answer to the needs of today's high-volume trailer operators. Reo's new "Super-V 63" Tractor is built for this specific purpose. It is proportioned and powered to guarantee the *greatest possible payloads* within legal limits for all modern trailers. Here is a combination of *greater* power, *greater* maneuverability, *greater* visibility and roominess for the operator, together with greater accessibility for service and maintenance, than anything of its kind on the road today.

Its giant 207 and 235 h.p. Reo Gold Comet engines are, pound for pound, the most powerful truck engines ever built. Available in gas or LPG models, backed by a *100,000 Mile or 1 Year Warranty.*

Reo's "Super-V 63" Tractors are available with all standard wheel-bases. So before you buy any other cab-over for pulling a high-volume trailer, be sure and *look at Reo.*

63 Tractor



MORE PAYLOAD

Measuring only 63" front-of-bumper to back-of-cab, Reo's new Super-V 63 Tractor pulls 35' trailer within 45' over-all when equipped with full-size sleeping bunker. This, together with only 29" bumper-to-center-of-front-axle measurement, guarantees greatest possible loads within legal limits.

MORE MANEUVERABILITY

Shorter turning radius plus power steering makes city driving and close-quarter handling for dock loading and unloading easier than ever before.

MORE VISIBILITY

Roomy, "Control Tower Cab" with 360° visibility provides greater driver comfort, safety, less fatigue. No distortion. Glass is optically perfect.

MORE POWER

Reo 207-235 h.p. V-8's are pound for pound the most powerful truck engines ever built. As much as 35% more efficient than industry average.

Today's High-Volume Trailers of All Kinds!

Mail for Complete Information Today!

REO MOTORS, INC., Lansing 20, Michigan

Please send, immediately, information on the following:

New Reo "Super-V 63" Tractors_____

Reo Truck Line_____

Gold Comet Engines: V-8's_____ Sixes_____

Gas_____ LPG_____

Name_____

Company_____

Title_____

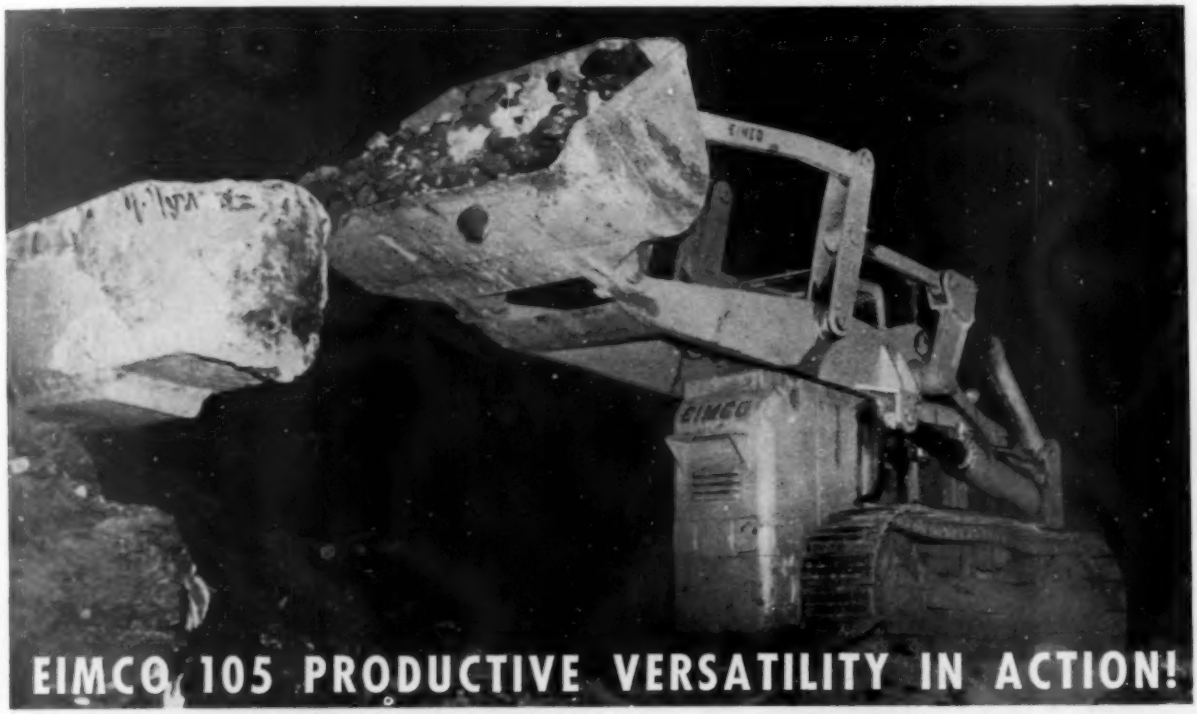
Address_____

City_____ (Zone)_____ State_____

REO

WORLD'S TOUGHEST TRUCK

. . . for more details circle 278, page 16



EIMCO 105 PRODUCTIVE VERSATILITY IN ACTION!

NEW! FRONT END LOADER

Here's the latest addition to the 105 wide-range family of rugged earth-moving tools.

In loading applications where physical and haulage conditions make its use more practical . . . here is a front end loading mechanism that gives you extra strength for the most severe job.

Large, double-acting hydraulic boom cylinders provide ample power to hoist loads weighing up to 15,000 lbs. to full height. Boom and bucket controls may be operated simultaneously.

To fill the big (2½ yard) bucket, this loader develops 25,000 lbs. digging force at the lip. 40,000 lb. pry-out force and 40 degree bucket tip-back at ground level gets full bucket loads, minimizes spillage. It carries loads close and low for maximum stability.

It operates in 9' 6" headroom . . . discharges into haulage units up to 14'.

Exclusive features of the hydraulic system provide an extra margin of protection against mechanical delays.

Bulldozer

Dozer blade attachments are designed to make full use of the extra-production features of the 105. In broad usages such as cutting haul roads for logging outfits . . . pioneering in shale and hard rock . . . clearing fire paths for the Forest Service . . . the Eimco 105 Bulldozer has proven its high-capacity ability the world over.

All attachments are Eimco-built to standard SAE mounting dimensions for the basic 105 Tractor. This means extra performance from every attachment through independent track maneuverability . . . up front visibility . . . power shift operating ease . . . balanced design for maximum stability . . . quality built for dependable on-the-job service.

Excavating Loader

Where digging is extra tough . . . and haulage provisions can be adopted to take full advantage of overhead discharge — the time-proven 105 Excavating-Loader will give you **bonus** loading power at the bucket lip and **bonus** dumping speed to accelerate the entire cycle.

Unique contour of the rugged rocker arms . . . bucket design and smooth, steady flow of engine power transmitted to the bucket lip through the torque converter gets 39,200 lbs. of digging force right where you want it . . . in the pile. Awkward maneuvering to get into dumping position is eliminated in ideal overhead discharge applications.

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Tex. Birmingham, Ala. Duluth, Minn. Kellogg, Ida. Pittsburgh, Pa. Seattle, Wash.
Cleveland, Ohio Houston, Tex. London, England Gateshead, England Paris, France Milan, Italy Johannesburg, South Africa

B-239

. . . for more details circle 305, page 16

B.F.Goodrich

Sandy soil and 24-ton loads—here's a job for new BFG Special Earth Mover tires

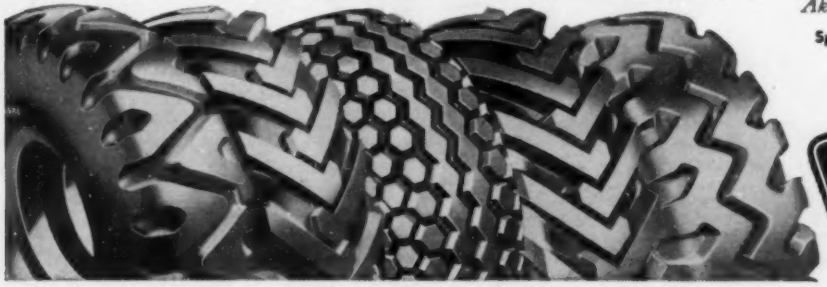
THAT giant scraper is hauling 24 tons of sand fill for troop barracks at Fort Ord, California. Plowing through sandy soil under this payload, plus the weight of the equipment, would cause most tires to bog down and become useless. That's why this contractor uses these giant B. F. Goodrich 65" Special Earth Mover tires with *all-nylon* cord construction.

Special Earth Mover tires operate at low air pressures. They conform to the soil, rolling over it rather than digging into it. And to stand the strain of this flexing, B. F. Goodrich builds the Special Earth Mover tire with an *all-nylon* cord body.

Nylon withstands double the impact of ordinary cord materials, resists heat blowouts and flex breaks. That's why B. F. Goodrich builds *all* of its off-the-road tires with an *all-nylon* body, why they can be recapped over and over!

Your B. F. Goodrich retailer has a longer-wearing, money-saving tire for every type of off-the-road work. See him today or write *B. F. Goodrich Tire Co., A Division of The B. F. Goodrich Co., Akron 18, Ohio.*

There's a B. F. Goodrich tire for every construction job



Specify B. F. Goodrich tires when ordering new equipment

B.F.Goodrich
FIRST IN RUBBER

Your B. F. Goodrich retailer is listed under Tires in the Yellow Pages of your phone book

. . . for more details circle 294, page 16

Personals

R. O. Wilson of Cosden Petroleum Corporation, Arlington, Texas, has been named chairman of the board of the Asphalt Institute, succeeding Sidney Goldin of Shell Oil Company.

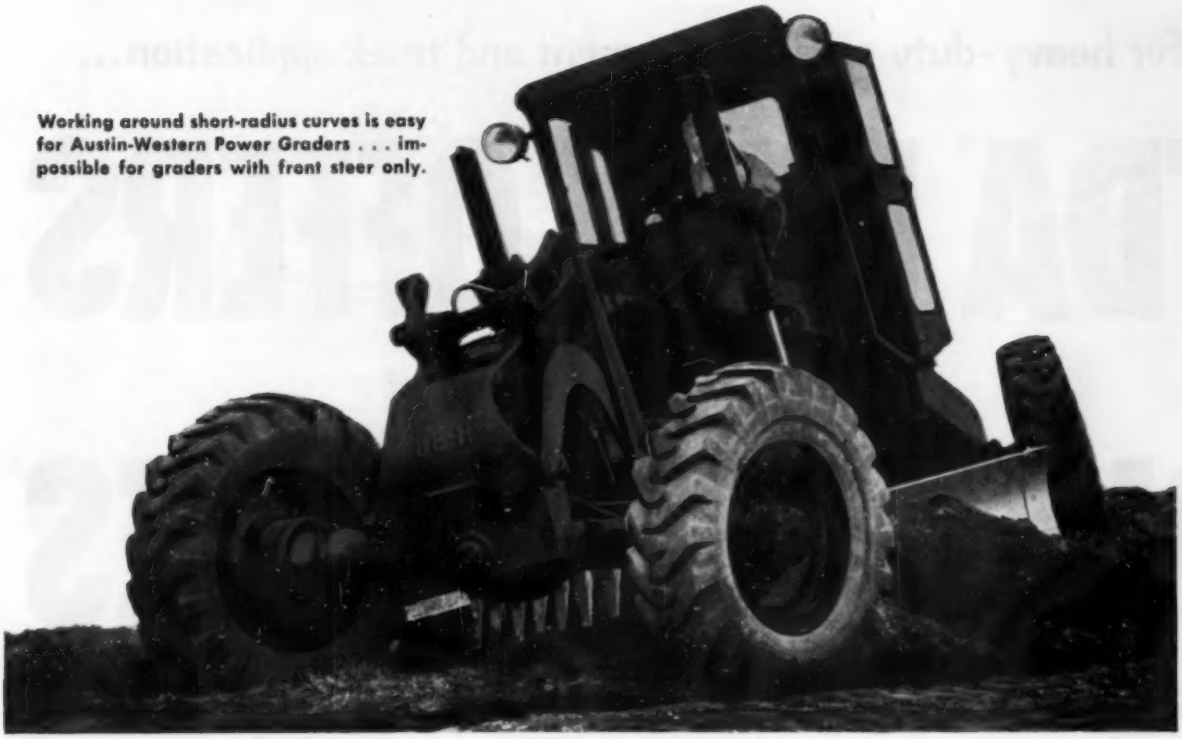
Mr. James G. (Guy) Lott, District Engineer, Texas Highway Department at Amarillo has retired. He was for 37 years with the construction and maintenance of Texas highways, being District Engineer for the past 15 years. Charles W. Smith succeeds him.

Slaughter, Saville & Blackburn, industrial engineering consultants of Richmond, Va., and Brown & Blauvelt, New York civil engineering firm, announce the formation of the professional partnership of Blackburn, Brown & Blauvelt of Richmond. The new partnership will continue the services combined of the parent firms.

James R. Libby, former chief engineer of the Freyssinet Company, Inc., and Enis Y. Baskam, former associate of Praeger-Kavanagh, Consulting Engineers, have entered into a partnership to practice as consulting engineers. Mr. Libby is a member of the ACI and ASCE, and is on the ACI-ASCE Joint Committee 323 on Prestressed Reinforced Concrete. Mr. Baskam has been in responsible positions for various consulting firms, including Praeger-Kavanagh. New firm office, 151 Radcliff Drive West, East Norwich, New York.

Leroy C. Smith, engineer-manager of Wayne County Road Commission at Detroit and with the county since 1918 has retired. He has the distinction of being the only engineer this county has ever had, having joined the organization at the beginning of the pioneering road program following World War I. Under Smith's direction, Wayne County became the nation's most famous county road organization and helped to create the first superhighways ever built.

William E. Kreger has been elected chairman of the Wayne County Road Commissioners (Detroit). He is a resident of Wyandotte which he has served as mayor, more recently serving as a member of the Wayne County Board and holding other civic responsibilities. Wayne County's highway program for 1957 will exceed $16,000,000.



Working around short-radius curves is easy for Austin-Western Power Graders . . . impossible for graders with front steer only.

AUSTIN-WESTERN POWER GRADERS

Twice as maneuverable...30% more power at the blade

Only Austin-Western offers you the unbeatable combination of all-wheel steer *plus* all-wheel drive *plus* torque converter drive in 4-wheel and 6-wheel models. All-wheel steer means top maneuverability . . . you ditch around sharp curves, move dirt up slopes from deep, wet ditches, grade superelevated curves with no gouging or wasting. A-W Power Graders turn around on narrow roads with only one backup, travel quickly and easily where ordinary models cannot go, move the heaviest windrows farther and faster. All-wheel drive means that every pound of the machine is harnessed to a driving wheel – no idling wheels, no lazy front ends to use up power and lower efficiency. Every pound is working weight, contributing 100% to traction, utilizing the whole engine output, delivering maximum power where it counts – at the blade.

Together, all-wheel steer and all-wheel drive make possible A-W's unique Controlled Traction. By offsetting the machine, the operator can put front and rear wheels where traction is best, can eliminate all side-thrust at the toe of the blade (usable over its entire length), and can balance the whole power of the grader against the load.

In addition, you get unusually versatile blade manipulation, and fingertip management of all blade and wheel movements by full hydraulic control. And A-W Power Graders have the most complete line of time- and labor-saving attachments in the industry. See your nearby A-W distributor. Or write us for detailed information.

The two circles above, with their 62 and 90-ft. diameters, illustrate the difference that all-wheel steer makes. This extra maneuverability saves time on every job, makes it possible to do more jobs—faster, easier and cheaper every month of the year.

All-wheel steer and all-wheel drive team up with the blade on A-W Graders —the rear drivers push behind the toe of the blade, the front drivers pull ahead of the heel of the blade. As a result, the machine moves straight ahead under perfect control.

Power Graders • Motor Sweepers • Road Rollers • Hydraulic Cranes

AUSTIN-WESTERN WORKS
BALDWIN-LIMA-HAMILTON
Construction Equipment Division
OTHER DIVISIONS: Eddystone • Lima • Electronics & Instrumentation • Hamilton • Loewy-Hydropress • Standard Steel Works • Madsen • Pelton
AURORA, ILLINOIS, U.S.A.

. . . for more details circle 199, page 16

For heavy-duty special equipment and truck application...

TDA® NOW OFFERS

today's broadest range of

PLANETARY AXLES

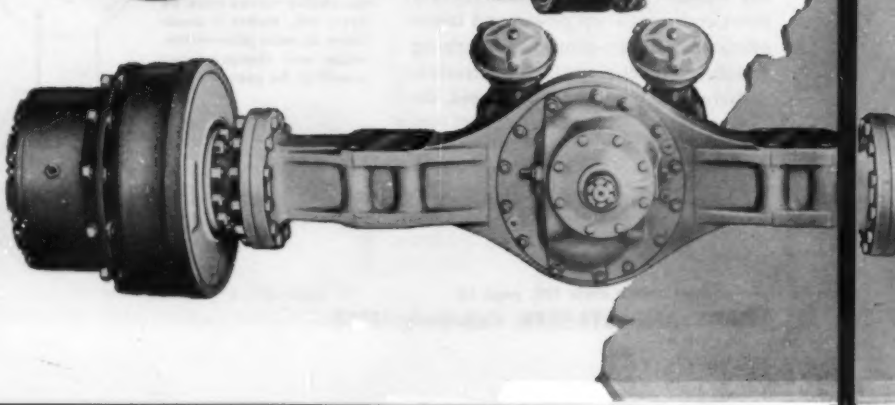
steering and rigid...from 11,000 to 75,000 lb. capacities!

A complete range of new planetary heavy-duty axles—with a steering axle operationally matched to each rigid axle in the line—is now included in the Timken-Detroit® family of advanced design axles. This matching of steering and rigid units brings you just the right axles for every requirement in both special off-the-road equipment and heavy-duty trucks.

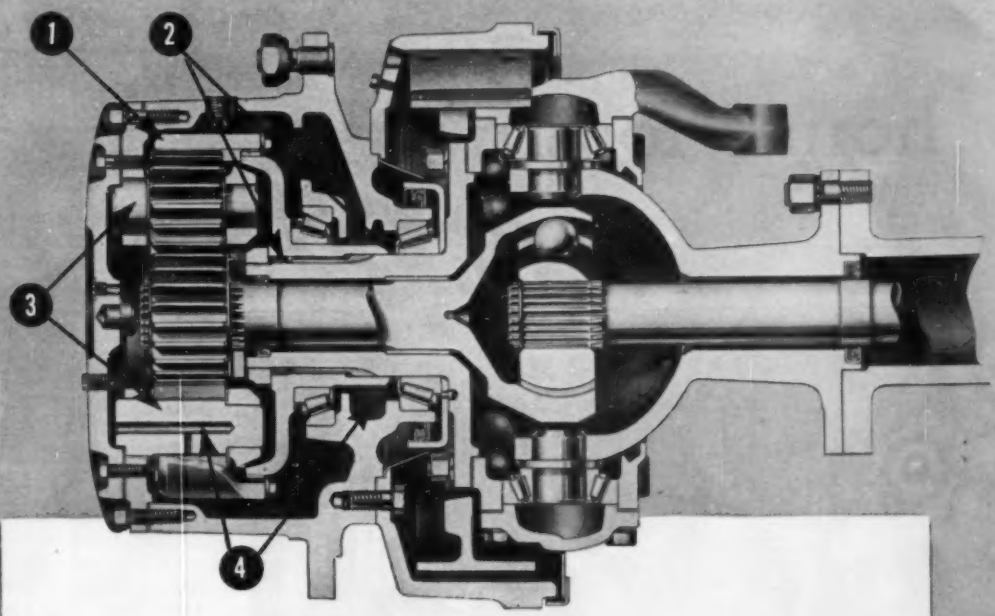
Years of research and development have resulted in these new and exclusive planetary OUTER-END features: *floating ring gears—concentrically mounted ring gear hubs—full-flow lubrication of all bearings and planet gears—special forged bronze planet pinion pins—and an unusually high degree of parts interchangeability.*

Because of their versatility, ruggedness and almost unlimited gear reductions, these new, full planetary axles are going into use all over the world on heavy-duty prime movers, big four-wheel tractors, off-road rock wagons, mining equipment, heavy-duty scrapers, front-end loaders and other heavy-duty equipment.

PLANETARY STEERING AXLE



PLANETARY RIGID AXLE



Only New Timken® Full Planetary Design Brings You These Features for Extra-Long Life, and Extra Dependability:

1. **New Floating Ring Gear** . . . Ring gear and hub are two separate pieces. Ring gear is free to float radially. This feature, combined with floating sun gear, assures equal distribution of stresses to *all* planetary gears, gives longer, trouble-free gear life.

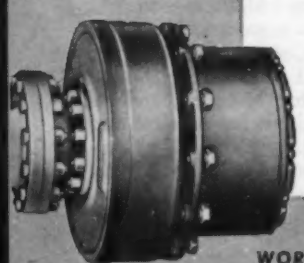
2. **Concentrically Ground Ring Gear Hub and Spindle Mounting Surfaces** . . . Concentrical grinding around a common center assures perfect alignment and fit—plus freedom from bending forces on the hub and spindle splines. Splines absorb only torsional stresses from the ring gear and transmit them to the housing.

3. **Special Forged Bronze Planet Pinion Pins** . . . Pins are forged of special alloy bronze for longer, trouble-free operation. Rifle drilled lubrication channels and machined lubrication flats assure full time lubrication of the planet pinions. When cover is assembled pin is locked in place to prevent rotation—resulting in longer pin life.

4. **Full-Flow Lubrication** . . . Design of Timken planetary axles assures constant flow of lubricants to wheel bearings and all planet gears while vehicle is in operation. Wheel hub and planetary spider pick up oil in the cast reservoirs as they rotate and channel it to wheel bearings and pinions. When vehicle is not in motion oil is retained in these chambers providing ample initial lubrication for all moving parts.

5. **High Degree of Parts Interchangeability** . . . Important to service and operation is the high degree of parts interchangeability between both rigid and steering axles in the same planetary series. This means a smaller parts inventory, low maintenance costs and more productive time with Timken planetary axle equipped vehicles.

Plants at:
Detroit, Michigan • Oshkosh, Wisconsin
Utica, New York • Ashtabula, Kenton
and Newark, Ohio • New Castle, Pennsylvania



For complete information on the TDA family of planetary axles—write Timken-Detroit Axle Division, Detroit 32, Michigan . . . or visit the TDA display at Booth No. 364 at the 1957 Road Show—Chicago Amphitheater, January 28th through February 2nd!

. . . for more details circle 286, page 16

TIMKEN Detroit AXLES
TIMKEN-DETROIT AXLE DIVISION
ROCKWELL SPRING AND AXLE COMPANY
DETROIT 32, MICHIGAN
The Accepted TDA Standard
TRADE MARK REGISTERED

WORLD'S LARGEST MANUFACTURER OF AXLES FOR TRUCKS, BUSSES AND TRAILERS

New Publications

WIDENING AND RESURFACING WITH BITUMINOUS CONCRETE. Bulletin 131. Four papers presented at the 35th Annual Meeting of the Highway Research Board, including data on wire mesh heinforcement, pavement widening in Idaho, resurfacing experience in Hawaii, and progress on avoidance of reflection cracking in bituminous resurfacing. Price of bulletin $0.90 remitted to the Highway Research Board, 2101 Constitution Avenue, Washington, D.C.

CHARTING STEEL'S PROGRESS. A graphic facts book on the iron and steel industry, published by American Iron and Steel Institute, 150 East 42nd Street, New York 17, N. Y. 1956 edition available on request.

TRUCK MOTION WEIGHING REPORT T-38. This report by the J. J. Heatley Company, Box 254, Smithtown, N. Y., contains much useful data on installations of electronically controlled scales beneath roadways for overland detection and for weighing in motion for routine gathering of traffic data. Copy available upon request to the above company.

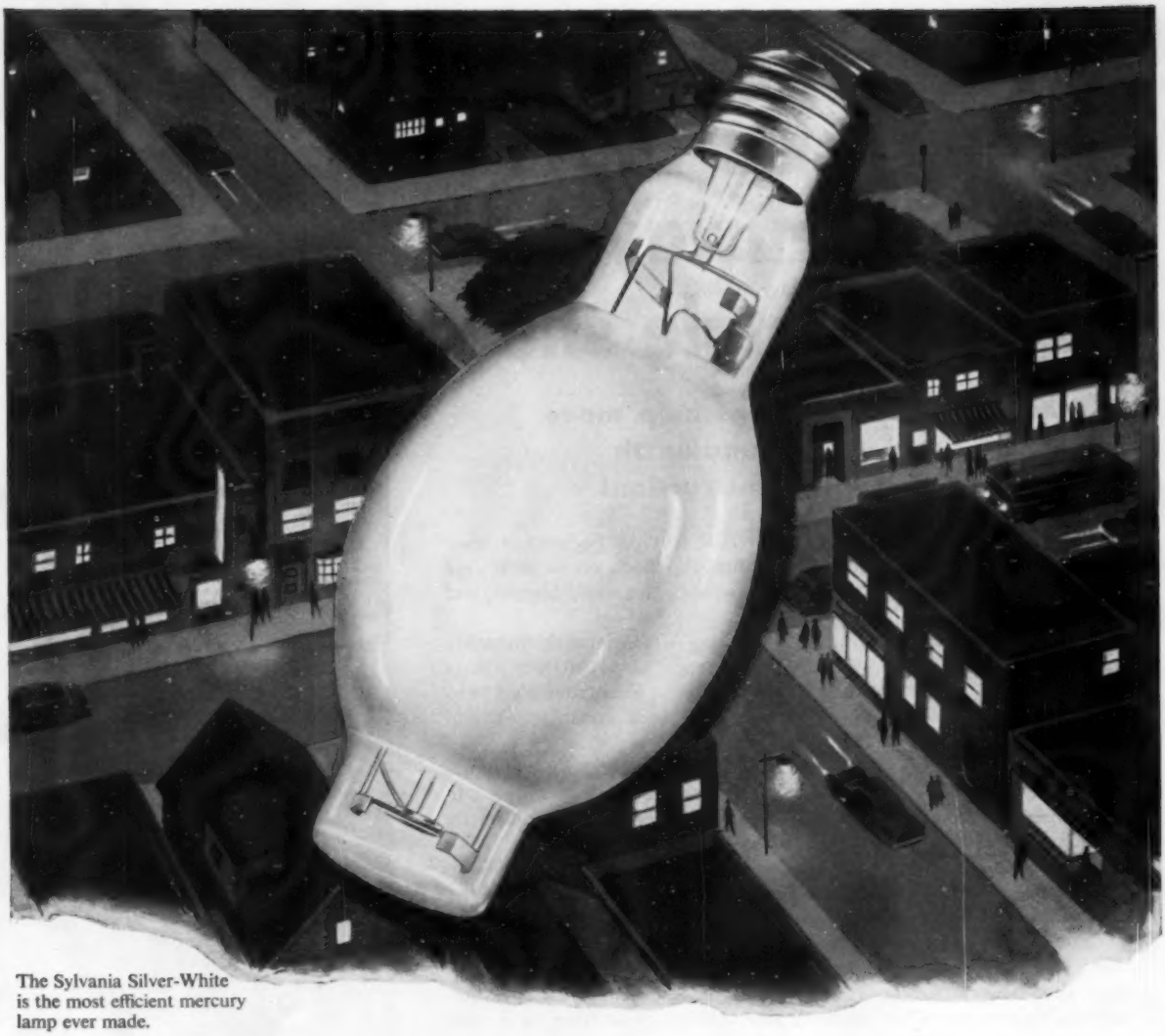
SIMPLIFIED PROBLEMS IN STRENGTH OF MATERIALS AND STRUCTURAL DESIGN, by Ephraim Viertels, 246 illustrations; 636 pp.; $5.00. An all-problem reference work for the structural engineering field.

The book is in three parts, and has twenty-two subject headings. Questions on each subject are presented, then problems on that subject stated and solved in step-by-step fashion. Total of 735 problems.

ASTM STANDARDS ON MINERAL AGGREGATES AND CONCRETE (with Selected Highway Materials), heavy paper cover, 360 pages, 6x9, $3.75.

This compilation of ASTM Standards includes the latest editions of standard and tentative specifications, test methods, and definitions of terms pertaining to mineral aggregates, concrete and selected highway materials. The publication is sponsored by Committee C-9 on Concrete and Concrete Aggregates and Committee D-4 on Road and Paving Materials, and includes all standards for concrete and concrete aggregates prepared by Committee C-9, but only those for selected nonbituminous highway mate-

(Continued on page 48)



The Sylvania Silver-White is the most efficient mercury lamp ever made.

Better vision for nighttime drivers

Today's effective street lighting source is the mercury vapor lamp . . . and today's most efficient mercury vapor lamp is the new Sylvania Silver-White.

Sylvania's new Silver-White Mercury Vapor lamp actually delivers up to 33% more lumens of light than previous color-improved mercury vapor lamps.

The higher efficiency of the Sylvania Silver-White Mercury Vapor lamp is graphically demonstrated by a typical installation in a major midwestern city where 100-watt Silver-White lamps are producing an unprecedented 4000 lumens!

Furthermore, Sylvania Silver-White lamps utilize more of the ultra-violet energy previously wasted.

Sylvania Silver-White lamps cost no more than conventional color-improved lamps, and are available in 100-watt, 175-watt, 250-watt, 400-watt, 700-watt, and 1000-watt types. They are particularly suited for street and highway lighting, approach lighting for bridges and toll stations and parking areas.

Learn how Sylvania Silver-White lamps—the most efficient mercury lamp—can help reduce accidents with better light at lower cost. Call your local Sylvania representative, or for complete information write to:

SYLVANIA ELECTRIC PRODUCTS INC.
Lighting Division, Dept. 7L-7202
60 Boston St., Salem, Mass.
In Canada: Sylvania Electric (Canada) Ltd.
Shell Tower Building, Montreal

SYLVANIA

. . . the fastest growing name in sight!

LIGHTING • RADIO • ELECTRONICS • TELEVISION • ATOMIC ENERGY

. . . for more details circle 283, page 16

11 rock-speeding PAYHAULER® TRUCKS star in seaway's biggest, single show!

8 other International® rigs help move 2,451,000 cu yd of rock and earth in $14½ million lock construction!

Eleven International "95" PAYHAULER trucks...because of their high speed, big pay-capacity and around-the-clock endurance...are playing the starring roles in the St. Lawrence Seaway's biggest, and perhaps toughest, single show!

The PAYHAULER units are sparking a demanding monthly production schedule of 120,000 yds of rock and 100,000 yds of common earth. The scene is United Waterways Constructor's $14½ million contract of the upper Beauharnois lock construction and channel excavation near Montreal, Quebec.

International TD-24 crawler tractors, TD-14 Skid Shovels, and a "75" PAYSCRAPER® are also vital producers in the moving of the total required 1,461,000 yds of rock and 990,000 yds of earth. Lock completion is scheduled for December, 1958.

PAYHAULER units have also been moving most of the rock on a lower Beauharnois lock. On a similar shorter-haul rock job in the midwest recently, two identical PAYHAULER units maintained a production average of 2,400 cu yds per day!...And here on the seaway, with average 4,000-foot one-way hauls, PAYHAULER units' high speed, next-to-automatic Torqmatic brake control, and minute-saving, easy-to-heap big capacity are cutting cycle time to a minimum and bringing home maximum loads as well.

The rugged PAYHAULER units on the seaway job are standing up to the toughest test in their spectacular career. They're working around the clock, 5 days per week, hauling mostly rock but also proving themselves in wet, job-fouling mud and on slippery, water-soaked lock floors.

Success on the seaway and on other tough jobs the country over is proving International PAYHAULER units to be what construction men themselves asked for...a big-capacity, high-speed hauler with low downtime and operating costs. See for yourself. Try an International PAYHAULER unit on your job.

TON-SIZED ROCKS go up . . . then down into fill in 12 seconds. Two-stage hydraulic hoist provides full-time power control. Hydraulic snubbing assures over-center dumping, gentles body return.

38 MPH SPEEDS keep three or four PAYHAULER units on haul road at all times. Hand-operated Torqmatic brake gives accurate control for safe, high-speed travel on congested haul roads. TD-24 tractor spreads rock for fill at railroad diversion.

MAXIMUM SHOVEL OUTPUT on upper Beauharnois lock construction is maintained by fast, easy-loading International "95" PAYHAULER units. High tensile steel sides, triple section bottom, super-duty "spring cushions" plus strongest frame in "95's" class stand rock-shock!

Construction details St. Lawrence Seaway Project #33

Project length	5,000 feet	500,000 yd rock	aggregate plant
Width of lock excavation	60 to 150 feet	270,000 yd rock	structure fill
Depth of lock excavation	54 feet	70,000 yd rock	railroad diversion
Approximate use and disposal of excavated material:		60,000 yd rock	yard areas, construction roads
40,000 yd brown clay	dyke construction	15,000 yd rock	rip-rap and dykes
400,000 yd earth	random fill	15,000 yd rock	service roads

INTERNATIONAL HARVESTER

INTERNATIONAL® Construction Equipment

International Harvester Company, 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE INCLUDING: Crawler, Wheel, and Side-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Trucks . . . Diesel and Carbureted Engines . . . Motor Trucks

. . . for more details circle 298, page 16

New Publications

(Continued from page 44)

rials or those involving aggregate gradings or tests developed by Committee D-4. It also contains pertinent specifications for cement under the jurisdiction of Committee C-1 on Cement, and references specifications on concrete reinforcement bars prepared by Committee A-1 on Steel.

Subjects covered include specifications and methods of test for aggregates (crushed stone, crushed slag, gravel, light weight); ready mixed concrete; air entraining admixtures; methods of test for air content of concrete, compressive strength, flexural strength, freezing and thawing, slump test; brick and block pavement materials; concrete curing material, expansion joint fillers; cement.

This compilation is useful to producers and consumers of mineral aggregates, concrete, and highway materials; and to engineers and contractors in both building and heavy construction. For copy address ASTM Headquarters, 1916 Race Street, Philadelphia 3, Pa.

CHARTED SUMMARY OF CONCRETE ROAD PAVEMENT SPECIFICATIONS—(State Highway Departments 1956). Available on request to Portland Cement Association, 33 W. Grand Ave., Chicago 10, Illinois.

CEMENT AND CONCRETE REFERENCE BOOK. 1956-1957 edition of this widely known publication has been issued by the Portland Cement Association. 112 pages of data with illustrations on the manufacture and uses of cement and concrete. Portland Cement Association, 33 West Grand Ave., Chicago 10, Ill.

RECOMMENDED PRACTICE FOR WINTER CONCRETING, a revised American Concrete Institute standard, has been published as a separate paper-bound reprint. The standard is the work of ACI Committee 604, Winter Concrete Methods, Lewis H. Tuthill, chairman, and incorporates certain changes over the committee's earlier work on the subject.

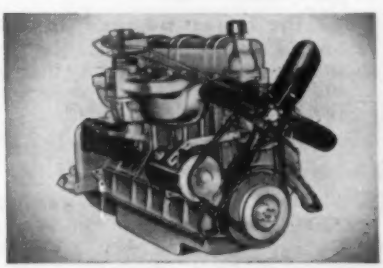
Air-entrained concrete and addition of one percent calcium chloride are recommended in cold weather. They permit a reduction in the time newly placed concrete must be protected. The standard covers the use of accelerators and anti-freezes; heating of

(Continued on page 54)

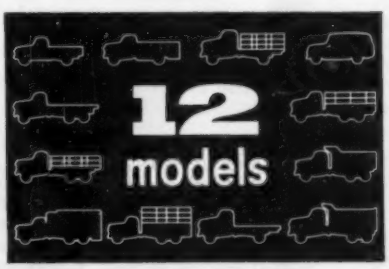
. . . for more details circle 298, page 16

. . . for more details circle 223, page 16

This is the popular light-duty Model S-120 (4x4) INTERNATIONAL Truck. Features full-size, 3-man-wide cab and a choice of 12 different full-size, factory-built bodies, including the widest 6½ ft. pickup in the industry. Powered by 131 hp., short stroke, 6-cylinder engine, gasoline or LPG fuel. Available with factory-installed 8,000 or 15,000 lbs. capacity front-mounted winch, snowplow and other specialized equipment.



7 Dependable, economical power with sixteen 6-cylinder engines, up to 212 hp. Heat-treated, forged steel crankshafts and big bearing areas for a longer, more useful life. Precision machined, quiet, long lasting timing gears, too.



8 Save time and money. Get the truck that matches your job *exactly*. No need to compromise with the great span of 12 factory-built INTERNATIONAL 4x4 and 6x6 models, 7,000 to 43,000 lbs. GVW. Choice of job-matched components.

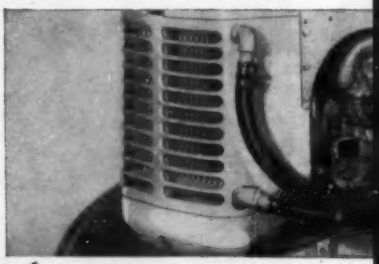
9 World's most complete line. There is an INTERNATIONAL "tailor-made" for every truck job, ½ tonners to 90,000 pounders. Choice of 4-wheel, 6-wheel and all-wheel-drive models, conventional and COE design. Every one built to cost *least* to own.

Check These Points Thoroughly
before buying a combination Tractor-Compressor

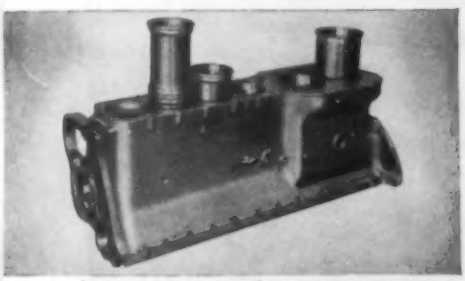
Absence of these engineering design features can mean less work done and more cost on your next job.

In recent years, combination tractor-compressor units have been increasingly popular. This is due, in large measure, to the fact that machines of this type are much easier to keep at work all day than their counterparts: an ordinary tractor and a standard portable compressor. To insure that you get the maximum benefit from any combination tractor-compressor unit, check these important points before buying.

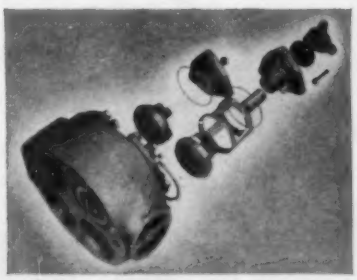
✔ **Location of the compressor air receiver** is important. The air receiver must be exposed to give you cool outside air in every operating condition, and should not hug the hot engine or be located next to the gas tank.



✔ **An air-cooled aftercooler** permits the tractor-compressor to deliver clean, cool, dry air hour after hour. Best cooling results can not be obtained from those units using a water-cooled manifold as an aftercooler.



✔ **Replaceable wet sleeves** in the cylinder construction of your tractor-compressor eliminate costly reboring jobs, and give you more efficient cooling by directing a 360-degree flow of water around each individual cylinder.



✔ **Interchangeable and replaceable compressor valves** let you get longer service life from your tractor-compressor. This feature also lowers your maintenance costs and assures top performance.

✔ **Plenty of operating space** is important, too. Be sure that your tractor-compressor permits the operator to drive and work efficiently and safely. He should be able to stand up while operating the unit.

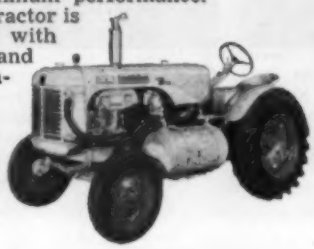
✔ **Wrap-around fenders are a must.** This is a major safety factor, particularly when the tractor is operating on rough ground or on highways and streets.

✔ **Many attachments for use with the unit** give you greater job versatility. Be sure your machine is designed for use with attachments such as the front-end loader, backhoe, and other tools.

✔ **A hood that is easily and quickly removable** helps reduce the time needed for minor repairs on your tractor-compressor. It permits preventive maintenance practices, too. Ask for this feature.

✔ **The fastest possible travelling speed** is a time-saving feature of the tractor-compressor. Be sure that your unit can get you from job to job in the shortest possible time.

✔ **If it's built and designed by one manufacturer** as a complete unit, you can be sure of maximum performance. Make sure that the tractor is designed to "work" with the compressor unit and is not an ordinary industrial tractor. The engine, too, should be a product of the manufacturer offering the unit. Your unit should "belong together."



These features can be found only in the Le Roi Tractair — a combination 42-hp wheel tractor and a 125-cfm air compressor. Be sure you get *all* the savings in time and money that the engineering design of Tractair offers you. Check before you buy.

LE ROI Division of Westinghouse Air Brake Co., Milwaukee 1, Wisconsin, manufacturers of Cleveland air tools, Tractair, portable and stationary air compressors, and heavy-duty industrial engines. Write us for information on any of these products. T-81

. . . for more details circle 234, page 16

Not Only Jet Fuel Resistant . . . But a

JET BLAST RESISTANT

JOINT SEALING COMPOUND

ALLIED JET SEAL

Cold Applied Joint Sealing Compound

U. S. MILITARY REQUESTS SEALER IMPROVEMENT FOR JET USE

Jet aircraft usage has required joint sealing compound manufacturers to develop a better sealing compound for concrete runways. A compound that would be practical for use by jet aircraft. Engineers stipulated that the compound should be improved in adhesion, cohesion, resilience and ductility at low temperatures. Primarily, IT MUST WITHSTAND THE TERRIFIC HEAT AND **BLAST FORCES** OF JETS, as well as be resistant to jet fuel. This compound must be simple to apply, quick to cure and be within the economic limits of federal military budgets. ALLIED USED THESE RECOMMENDATIONS AS **MINIMUM REQUIREMENTS** IN THE DEVELOPMENT OF ALLIED JET SEAL.

PERFECT FOR JET RUNWAYS

- **QUICK CURING**

Runways where Allied JET SEAL has been used can be opened to foot traffic in thirty minutes and heavy aircraft traffic, such as a 456,000 lb. gross load jet bomber in eight hours.

- **BLAST RESISTANT**

Allied JET SEAL will not be blown from joints by the blast of the jet engines now being used, even under prolonged exposure. There are no cold flow tendencies even at temperatures in excess of 300°F., thereby assuring that Allied JET SEAL will remain where placed. These characteristics also make it possible to seal vertical and overhead joints.

- **JET FUEL RESISTANT**

In addition to its other characteristics, Allied JET SEAL is unaffected by jet fuel, oil and solvents.

- **ECONOMICAL**

Allied JET SEAL is well within the monies appropriated to the Armed Forces for airfield use. Admittedly the initial cost for Allied JET SEAL will be slightly higher; however, maintenance cost will be greatly reduced. The expectant life of the sealer material is increased as much as 250% over presently used J.F.R. materials.

- **SIMPLE APPLICATION**

Allied JET SEAL is a two-component cold applied compound. When the two components are mixed, they set up immediately; therefore, they must be kept separated until just before entering the joint. Allied has developed special equipment that proportions, pumps, mixes and places the compound automatically, making the operation even simpler than previous methods. This equipment is available to contractors, qualified agencies or individuals by purchase or lease.

Allied Materials Corporation also manufactures regular joint sealing compounds meeting Federal Specifications SS-S-164 and SS-S-159. Write for additional information.

ALLIED MATERIALS CORP.

PRODUCERS, REFINERS AND COMPOUNDERS FOR OVER 25 YEARS

General Offices: Braniff Bldg., Oklahoma City Plants: Stroud, Okla., Paramount, Calif., Detroit, Mich., New Market, N.J., and Brantford, Ont., Canada.

. . . for more details circle 197, page 16

. . . for more details circle 234, page 16

New Publications

(Continued from page 48)

materials, preparation of subgrade; protective coverings and enclosures; curing; and form removal. Supplementary material on the effects of concrete curing temperatures and a list of selected general references are included.

The price of the standard in separate reprint is 75 cents (50 cents to ACI members). Review copies are available to engineering editors without charge from: American Concrete Institute, 18263 West McNichols Road, Detroit 19, Michigan.

How bypasses affect community business

Contrary to general business opinion only a few years ago, highway bypasses (relief routes) usually help business and raise property values, a nationwide survey by the Chamber of Commerce of the United States discloses. As a result, many business men who once opposed bypasses now fight to get them.

Results of the survey are published by the Camber in a booklet entitled "How Bypasses Affect Business." The publication points out that the new national highway program, which calls for 42 percent of federal-aid construction in urban areas, will mean that many towns and cities from coast to coast will face the bypass problem.

The publication cites a survey of nine cities by the California division of highways listing the effects of bypasses on various business along the by-passed routes. With few exceptions the businesses showed gains, some ranging as high as 132 percent. Other studies showed an increase in land values along by-passed routes.

Copies of "How Bypasses Affect Business" may be had from the Chamber of Commerce of the United States, Washington 6, D.C., for 50 cents each, with reductions for bulk orders.
ers, with Blaw-Knox for the past 6 years,

CONTRACTS, SPECIFICATIONS, AND ENGINEERING RELATIONS (3rd edition.) By Daniel W. Mead, rewritten by staff of Mead and Hunt, Inc., and Joseph R. Akerman. 427 pages. Price $7.00. Part of McGraw-Hill Civil Engineering Series. All chapters have been rewritten and the book thoroughly modernized. Remit to McGraw-Hill Book Company, 330 West 42nd Street, New York 36, N. Y.

New LORAIN-85A

brings 2½-yd. shovel users new performance-profits!

"JOY STICK" AIR CONTROL for easier operation

- *Greater operating ease with 2-lever "Joy Stick-Air Ease" power controls. "Metered Air" feeds power to clutches at any rate and amount desired and still retains full "feel" of all operations. The newest, simplest, most responsive and most effortless development in shovel-crane power controls. Less effort, less motion, less fatigue.*
- *Full "Air Ease" control of all crawler operations at the operator's position for tread lock, swing-travel jaw clutches and steering.*
- *All clutches are newly designed and air operated.*

FOR INCREASED CAPACITIES

- *The Lorain-85A is a 2½-yd. shovel with 41 to 48-ton capacity as a crane on a general-purpose 2-speed crawler.*
- *An extra-wide, extra-long crawler provides for crane capacities of 50 to 60 tons.*
- *New square-tubular-chord crane boom design reduces boom weight and increases lifting capacities. On large crawlers, boom length to 200 ft. long, plus 40 ft. tip extension may be used.*
- *New 2½-yd., 62-in. wide Hoe bucket now available on 27 ft. boom. Other Hoe dipper sizes available beginning at 1½-yd. sizes.*
- *New, removable rear counterweight reduces overall weight. Can be removed in a matter of minutes.*

FOR LONGER LIFE LESS SERVICE COST

- *New Shear Ball mounting . . . the new idea in turntable mounting design. Turntable is secured to crawler and revolves easily and freely on a huge "ball bearing." No center pin or nut—no turntable rollers—with their adjustments, maintenance and lubrication.*
- *Torque converter power-take-off is available for the most efficient, smoothest method of taking full advantage of the abundant power supplied for turntable operations. "Never-say-die" power; adjusts automatically to digging needs; no shock; no stall.*
- *Generous use of anti-friction bearings throughout the new Lorain-85A. Used on hoist drums, swing drums and retract and crowd clutch drums. Crane boom head sheaves also on anti-friction bearings.*

Nothing has been spared in the new Lorain-85A to put it far ahead of the field in the 2½-yd. shovel-crane class. Every improvement, every refinement—from the new look in the new cab to the hidden anti-friction bearings—has been incorporated to give owners the last word in performance and profits. Many design improvements that increase capacity and result in easier, smoother operation enable the "85A" to live a longer, trouble-free life.

Don't miss seeing it. Ask your Thew-Lorain Distributor for all the facts and figures. Make every comparison. Only then can you appreciate the Lorain-85A built-in values that will pay you profits for a long time to come!

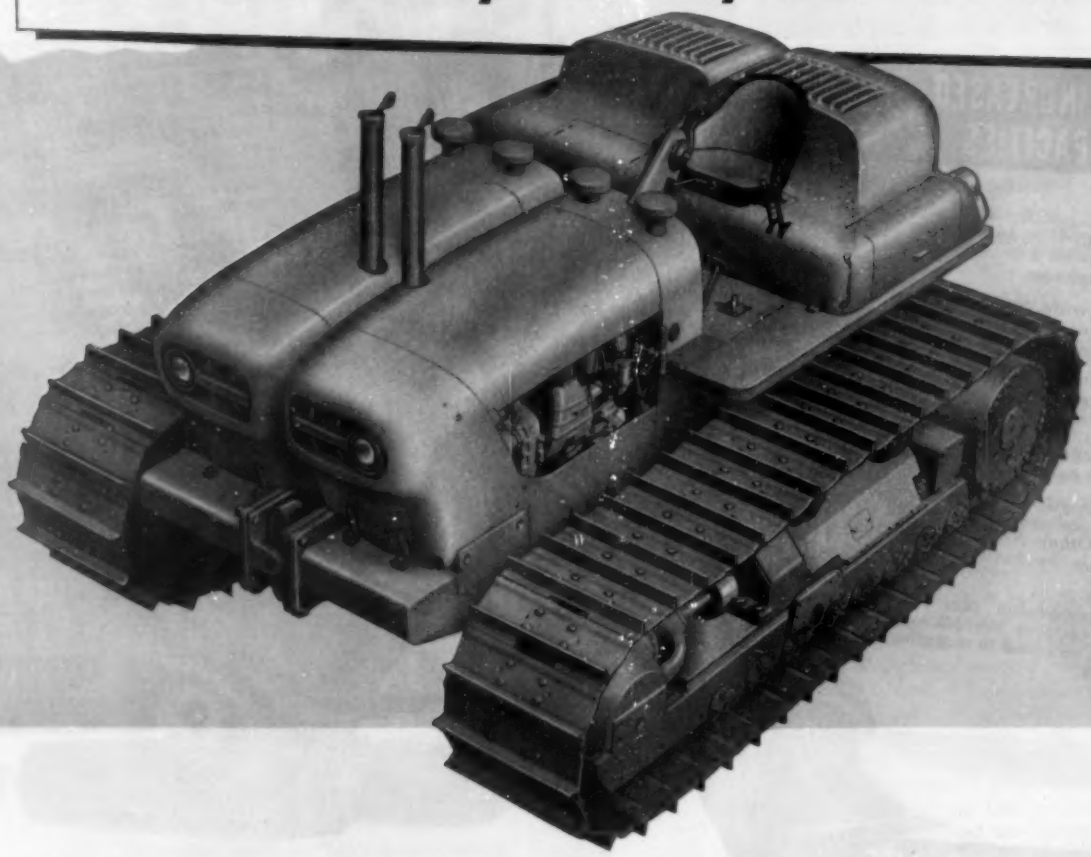
. . . for more details circle 252, page 16

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

NOW THE Euclid TC-12 GIVES YOU

more horsepower... more track area... more accessibility than any other crawler!



Ever since it was introduced more than a year and a half ago, the Euclid TC-12 Tractor has set completely new standards of crawler production and performance. It has proved, on job after job, that it is years ahead of the field in ability to do more work—faster, easier and cheaper. Now the TC-12 has even more power to handle the biggest tractor jobs.

Powered by two 218 h.p. engines with separate Torqmatic Drives for each track, there's a total of 436 horsepower. Big 27" standard shoes and 8 track rollers give good balance with the additional horsepower, heavy duty dozer blades and other attachments.

This new TC-12 Crawler has many other improvements that put it even further ahead of other tractors . . . in performance, ease of operation, maneuverability and service accessibility. Ask your Euclid dealer to prove that the TC-12 has no equal for big tractor jobs and have him show you why ***Euclids are your best investment.***

EUCLID DIVISION GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

20% MORE WORK-ABILITY

Euclid "Twins"—the TC-12 Tractor and Twin-Power Scraper—will move the cheapest dirt on the big road program or on any earthmoving job. They can set new production records at lower cost on your operations.

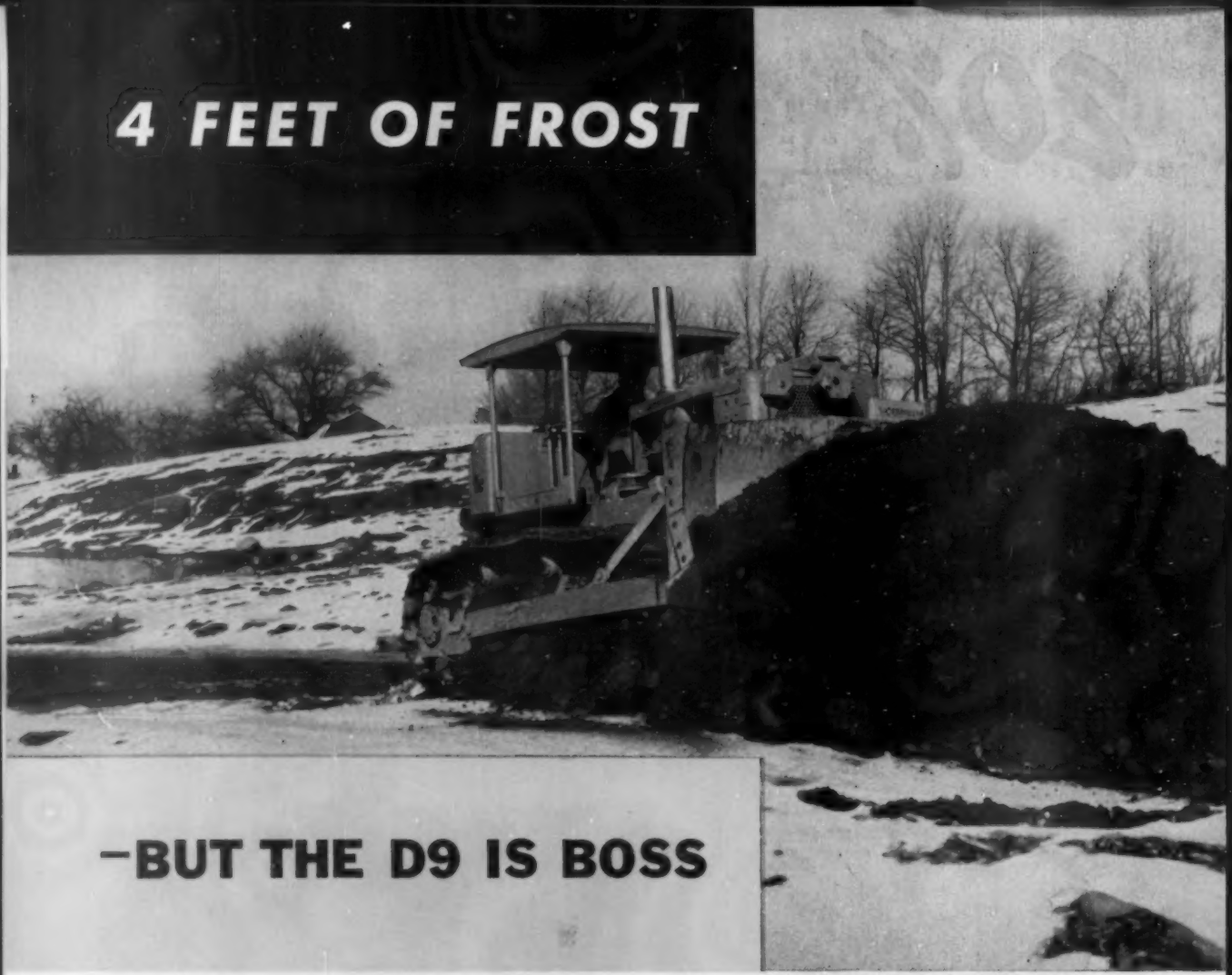
The Euclid TC-12 has exceptional maneuverability because each track has a separate power train. Operator has excellent visibility and "hair trigger" control of steering in any of the three speed ranges, forward or reverse.

With separate Torqmatic Drive for each big track, the TC-12 is fast on its feet, with plenty of power and traction for any big tractor job. It has proved its ability to outwork any other tractor on dozing, clearing, push-loading scrapers and pulling big equipment.

A high production machine, the TC-12 is easy to operate—delivers more push-pull drawbar horsepower at high travel speeds. Unitized assemblies and easy accessibility of major components permit servicing without major tear-down of other parts.

For push-loading big scrapers the Twin-Power "Euc" crawler has no equal. Torqmatic Drive provides a smooth, steady flow of power—changes from one speed range to another and from forward to reverse are made under full power.

4 FEET OF FROST



—BUT THE D9 IS BOSS

Boss of all bulldozers is the giant Caterpillar D9 Tractor. When this picture was taken last winter, John Arborio, Inc., was moving 1½ million yards of frozen earth, 75% of it rock, to build a section of Route 17 in Sullivan County, N. Y. With four feet of frost in the ground, conditions were about as tough as possible.

That didn't stop the D9. With its CAT*-built No. 9S blade, this machine weighs over 34 tons, and its broad tracks with hardened steel grousers give it tremendous 'dozing traction. It has the *power* to dig into hard ground, too—320 HP at the flywheel, and 98,000 pounds maximum drawbar pull!

In repeated tests where accurate records have been kept, one D9 has outworked *two* bulldozers of the next size. Blade loads average 12 cubic yards of earth and are handled at higher speeds. On 'dozing hauls up to 100 feet, cycle times average less than 1½ minutes, and production runs up to 600 cubic yards per hour.

. . . for more details circle 209, page 16

The D9 is big, heavy and ruggedly built to lick the toughest jobs. Yet, with its power-boosted controls and excellent visibility, it's one of the easiest of all tractors to operate. Maintenance is easy, too. The D9 is available with either torque converter or direct drive with oil clutch.

Your Caterpillar Dealer can show you performance records that prove the real economy of the D9 as a bulldozer, pusher or hauler. And he stands behind the long life of every machine with reliable, round-the-clock service and parts you can trust. See him today!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

HEAVY-DUTY EARTHMOVER FOR THE HARD WORK

major tear-down of other parts.

ROADS AND STREETS

BLASTING VOLCANIC ROCK

Without Blasting Neighbors

Short-period delay detonators help California contractor in blasting for Freeway in San Diego Area. Advance contact with neighboring property owners paid off in good will.

One of a Series on Rock Excavation

CUTTING through the brown hills eight miles east of San Diego, California, the Guy F. Atkinson Company of South San Francisco has recently pushed a 7½-mile six-lane freeway job on state highway 94.

This article deals specifically with the problems that were encountered by the company's engineers in a 2.59-mile section of the project lying between Lemon Grove (population 10,000) and some low hills.

Geologically this area can be described as part of the Santiago Peak Series, or Black Mountain Volcanics, consisting of Jurassic Volcanic rocks. The rock structure of the area appears to be mostly andesite with a specific gravity of 2.68. Atkinson's work here included removal of 500,000 cubic yards of rock and dirt by "shoot and shovel" and another 200,000 cubic yards with scrapers for the cuts. The formations in this section often change vertically from basalt rock to marl within 10 to 20 ft. of distance.

The blasting and excavation work was in some instances within 200 ft. of homes or buildings. Knowing that the company would have to do extensive blasting in the area for many months to come, the Atkinson Company officials began conditioning the townspeople by having short articles published in the local newspapers and making house-to-house calls in the immediate area. Such "public relations" effort was deemed a necessity because blasting is extremely rare in urban areas of Southern California, where "scraper" methods predominate.

The neighbors who were strangers to blasting had to be kept calm during some relatively heavy blasts, if the contractor were to use open methods designed for economy and reasonably rapid progress. For the benefit of younger men coming along, the following details are given for a typical

● **A large blast near building. Note inward throw, resulting from skillful application of millisecond-delay technique.**

● Drilling 4-in. blast holes with a pair of Joy TM-500 drills.

fairly large shot. For this blast 525 holes were drilled for shooting a rock mass 200 ft. wide, 30 ft. deep, and 125 ft. in length.

These holes were put down by two types of equipment.

(1) Two Joy-Challenger TM 500 drill-wagons were employed to drive four-inch holes in the center of the through cut involved. Holes were usually drilled to 30 ft. depth for the roadbed area and 27 ft. depth starting up the side slopes.

(2) For the slope drilling, three Gardner-Denver D-99-D wagon drills using Timken Carset DCX bits began drilling, ranging in depth from 6 to 24 ft. going down the slopes at varying centers.

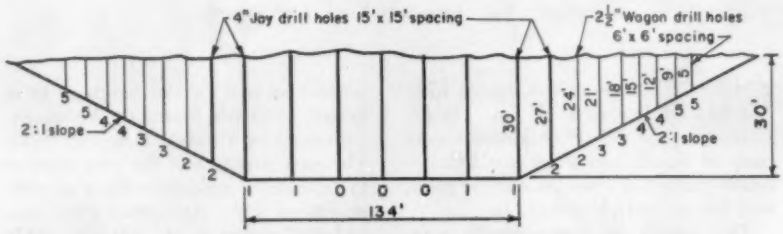
Four Gardner-Denver rotary 600 compressors supplied the air for both drill teams.

The 4-in. holes all having depths from 27 to 30 ft. were packed with Hercules Bag 65% strength and primed with one or two sticks of Hercules Gelamite No. 2.

The smaller (2-in.) holes in slope areas were packed with Gelamite No. 2, beginning with 2 sticks in the shallowest holes (6 to 9 ft.) at slope edges.

To minimize vibration, control the throw inward, and insure good fragmentation, the established millisecond-delay method was put to full and effective use here. Starting at the first row of 2½ in. holes at 6 ft. depth, each successive row was carried about 3 ft. deeper (see drawing) until the maximum depth of 24 ft. was reached. The first and second rows of holes were wired for No. 5 delay, the third and fourth holes for No. 4, fifth and sixth holes for No. 3, the seventh and last row for No. 2 millisecond-delay caps.

The next row of holes toward the centerline was the outer line of 4 inchers at depth of 27 ft. These also had No. 2 delay caps. The ninth row of holes, along at the base of the slope and marking beginning of the cut bottom, together with next row in, had first delay caps. The eleventh and twelfth (center) rows had zero delay. The far side of this typical cut was wired in symmetrical pattern.



● Delay sequence used effectively for the 525-hole blast described.

All charges were connected with No. 20 wire and all connections secured, and sand was stemmed into the holes to approximately one-half their depth. Then, in accordance with good safety essentials, Atkinson's blasting and drilling superintendent, Carl Schmidt, personally checked each hole to see that it had been properly stemmed and that all connecting wires were secure.

"It's better to take time and check all the holes and connecting wires," commented Schmidt, "than have to try and dig out a charge that failed to detonate."

After everything was checked, the

● Three of four Gardner-Denver 600 rotary compressors used on the job site. Note tripod-mounted flood lights at right; work progresses on both day and night shifts.

connecting wires were hooked up, with 35 holes to a series, to a DuPont CD48 condenser-type blasting machine. The area was cleared of all workers and all spectators were asked to shelter themselves. A warning whistle was blown three times and the charges detonated.

The blast here described was comparatively "light" as there were homes within 200 ft. of the blast site. Elsewhere, in less restricted areas, blasts involving as much as 30,000 cu. yd. at a time, or slightly larger, were employed. No seismographic recordings were made, but Atkinson's engineers estimate that the energy ratio for the blasts was kept well below the accepted safe ground vibration ratio. Some of the homes bordering the freeway blast sites were found not to be of the best construction, and the ratio was maintained to prevent even minor damage.

Occasionally secondary blasting was done, with a jackhammer and ½ to ¾ of a stick of Hercules Extra Gelatin 40%.

Some areas were found to be saturated with spring water. Here Atkinson's blasters used Extra Gelatin 40%, electric caps and Primecord with good results.

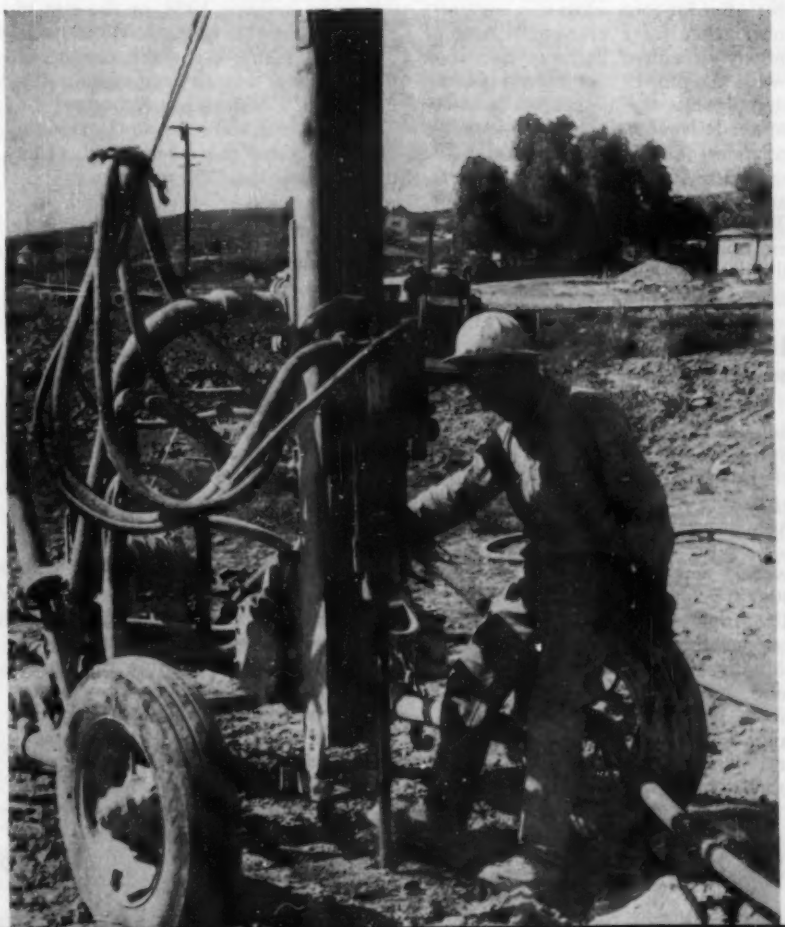
Rock excavation and hauling were done with a Bucyrus-Erie 88-B 4-yd. diesel shovel and six Euclid 15-yd. rear-dumps. Two Caterpillar dozers, both equipped with 9 ft. blades, assisted the shovel, one D9 dressing the slopes and one B8 doing pit cleanup. A third dozer spread material on the fill. Borrow material totaling 118,000 cu. yd. was dispatched from a nearby pit by a Northwest 80D shovel.

Thomas G. Hawley was project superintendent for Guy F. Atkinson Co.,

● **Project superintendent Thomas G. Hawley and blasting and drilling superintendent Carl Schmidt, consult plans for their freeway job.**

● **Bucyrus-Erie 88-B shovel loads one of the Euclid TD-46 end-dumps for 3,000 ft. haul to fill.**

● **Gardner-Denver D-99 wagon drills putting down 2½ in. holes.**



● Vice President nominee Fred W. Heldenfels, Jr., left, is congratulated by AGC President Frank J. Rooney, Frank J. Rooney, Inc., Miami, during mid-year meeting of Governing and Advisory Boards in Milwaukee. Mr. Heldenfels is a highway contractor, Heldenfels Brothers, Corpus Christi. The AGC clan has their convention in Washington D. C., March 11-14.

on this still-continuing job, and Virgil Chapman was general excavation superintendent. Donald Smith was resident engineer for the California division of highways, district XI.

This job of course represented nothing really new or sensational in blasting. But for contractors and engineers responsible for a growing volume of highly urbanized highway relocation work, the project is of interest because it represents the application of safety methods combined with good public relations. Of course, it took reliable explosives, safety-conscious workers, and supervisors with long experience. These ingredients, when all are present, insure safe conduct of road work that otherwise can prove quite dangerous and costly.

Interstate relocations set for big mileage

The detailed location of more than half of the mileage on the National System of Interstate and Defense Highways has now been established, according to the Federal Highway Administrator's office. Several states have determined the exact location of over 75 percent of their portion of the 40,000-mile system of expressways. These ingredients, when all are present, insure safe conduct of road work chusetts, Minnesota, Mississippi, Missouri, New Hampshire, New Mexico, North Dakota, Oklahoma, Rhode Island, South Dakota, Tennessee, Texas and Vermont, and the District of Columbia.

Following enactment of the new highway legislation in June, 1956, the Bureau of Public Roads urged all states to proceed with the detailed location of the system and to take steps toward acquirement of rights-of-way with the greatest possible speed. The BPR is required to report to Congress in January, 1958, on the cost of completing the original 40,000 mile system. Fixing the exact location of routes is a first step in making this estimate. Congress has authorized the addition of 1,000 miles to the system, but the cost of this mileage will not be included in the 1958 report.

Tighter labor market

(Bulletin from Virginia Road Builders Association)

One of the chief troubles in sight for 1957 appears to be in the field of manpower. Last August saw the nation reach an all time high of 66.7 million employed persons. A new high of 70 million is expected in 1957. This means that the law of supply and demand will operate to raise the cost of labor on almost every industrial front in the nation.

To illustrate this with a practical application, we note that in the Norfolk area the rate for cement finishers has already gone to $2.25 per hour effective January 1, 1957. In the Richmond area, the Operating Engineers are attempting to close agreements with contractors which call for one increase as of January 1st and another on October 1st. Some of these range up to 35c per hour. In addition, certain operators must be paid for 40 hours whether the time is worked or not. Master Mechanics and Foremen are required where five or more units are in use. These so-called fringe benefits will mount as time goes on. The major question would seem to be—"Where do we go from here?" The contractor must estimate in 1957 a lot of costs which will not come up until 1958.

Meetings

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS—Spring Meeting, Hotel Francis Marion, Charleston, S. Carolina; February 15-16.

ASSOCIATION OF ASPHALT PAVING TECHNOLOGISTS, annual meeting, Atlanta Biltmore Hotel, Atlanta, Georgia—February 25-27.

AMERICAN CONCRETE INSTITUTE—Annual convention, Statler-Hilton Hotel, Dallas, Texas; February 25-28.

43RD ANNUAL ILLINOIS HIGHWAY ENGINEERING CONFERENCE, Urbana, Ill., February 26-28.

ASSOCIATION OF HIGHWAY OFFICIALS OF NORTH ATLANTIC STATES. Annual convention, Hotel Traymore, Atlantic City, N.J.; Feb. 27-March 1.

AMERICAN CONGRESS ON SURVEYING AND MAPPING. 17th annual meeting, Shoreham Hotel, Washington, D.C., March 3-9, 1957. (American Society of Photogrammetry, 23rd annual meeting to be held in conjunction with the above meeting.)

UNIVERSITY OF UTAH—18th Annual Highway Conference, Salt Lake City; March 4-6.

ASSOCIATED GENERAL CONTRACTORS OF AMERICA, INC.—Annual Meeting Statler Hotel, Washington, D.C.; March 11-14, 1957.

OHIO HIGHWAY CONFERENCE, Ohio State University, Columbus, Ohio—April 2, 3 and 4.

AMERICAN WELDING SOCIETY—Fifth annual Welding Show, Convention Hall, Philadelphia; April 9-11.

PLANNING IS THE MAGIC WORD

Among the two hundred or more speakers who made up the four-day program at the Highway Research Board's recent annual meeting, it is worthy of comment that one of the most stimulating single thoughts came from an "outsider". The editor of Architectural Forum, Donald Haskell, kindled the imaginations of the 1,500 delegates by his picture of the planning job that faces highway engineers and administrators.

At least 56 million more Americans will be with us by 1975, reminded Haskell, and with them 50 million more motor vehicles. Despite this growth however and the move to the suburbs which will generate still more intra-area traffic, it will still be possible to "open up central cities to generous use of the automobile."

"But we must wipe out of our minds many things," this speaker continued, "for example, urban boundaries. A city boundry is something that the wheels of an automobile do not recognize. The idea that state and county authorities can carry a highway to the so-called city limit and there turn it over to somebody else is no longer valid."

● This observer also warned us that parking can no longer be treated as a separate problem. A highway system without adequate parking is like a railroad without a depot. He pointed to the Fort Worth plan of a close-in central highway ring, which would provide large parking structures on the edge of the central business district and free the district for pedestrian flow.

Haskell, as an architectural leader, speaks for a profession paralleling our own. Architects once were preoccupied with fluted columns and other embellishments, later evolved as planners of structures for functional use, and still more recently have lent a hand in city or area planning. Similarly, highway engineers and administrators who once dealt chiefly with roadbed materials are more and more concerned with the economic and planning aspects. The papers given at the recent highway research meeting included many reports on the expanding inquiry into such facets as need studies, legal problems, economic impact of new facilities, techniques of conducting location hearings, roadside design and the public welfare, and other nonphysical problems.

Everywhere we turn the call is for more young engineers to make highway work their career. Foremost in this need is for the rapid maturing of a new crop of administrators reared in the statesmanship concept of public service.

● The need for broad over-all planning is particularly acute in urban areas, where half of the billions voted for Interstate System relocation will be concentrated in the next thirteen years. A long-overdue step was the recent formation of a joint cooperative committee between the AASHO and the American Municipal Association. Master plans are needed before sound expressway location and design can be achieved. Such a plan for any area must come about through an intimate joint effort between state, city, county and other local government bodies, business groups and citizens. Research is needed to blueprint the best and most workable way to do the teamwork job.

Planning was once an ugly word, standing in the public mind for visionary crackpots who thought of nothing but how to spend tax money. Planning today is the most important word in our language. Engineers from their student days, and throughout in-service training and their entire careers in road-building agencies, must be encouraged to see the broad canvas.

A highway is no longer just a piece of paving between two farm fences. Nor is it just a part of the transportation system, to state a broader concept.

Highways are the very key to the whole community development at a time when we are experiencing explosive growth.

AASHO Atlantic City Convention Theme:

"Let's Get Rolling"

Notes on the annual meeting of the highway officials, at which technical committee work was revealed to be well in hand, while leaders considered top-level problems of expanding the highway effort on schedule.

"THIS is the first convention I can recall where our first concern wasn't over money."

So noted a highway department leader in a private corridor session at the AASHO's 42nd annual meeting, held November 27-30 at Atlantic City.

Money problems still exist, of course (some states hard pressed for matching funds), but the over-riding question at Atlantic City was, "how can we step up the advance engineering, cut red tape and get the long-range federal highway program, as enacted last summer, rolling on schedule?"

Confirming the seriousness of the expansion problem (as told in "Blueprint for the Expanded Highway Program," Roads and Streets, June '56), the nation's No. 1 roadbuilder, Bertram D. Tallamy, told the AASHO delegation that much red tape would have to be cut to complete the new highway program on schedule. "Every month we delay, we hinder progress across the country," said Tallamy, who was then winding up his affairs as Chairman of the New York State Thruway Authority before tackling his new job.

The new administrator inferentially chided the delegates who will be chiefly responsible, as executives in the state highway departments, for constructing the 41,000 miles of Interstate reconstruction which will be the heart of the expanded federal road program.

• "We really are not on schedule," he said. "You have been living off the plans accumulated in the last two years while awaiting favorable Congressional action. Now you must apply vision and ingenuity to meet the 13-year time schedule for completion of the modern road network."

Mr. Tallamy took cognizance of the fact that in the past some of the bottlenecks have been at the federal level. He pledged that the Bureau of Public Roads, which must continue to approve all federal-aid plans, would clean its house and streamline its operations to the maximum.

Also speaking before the convention, interim administrator John A. Volpe of Massachusetts warned of two pitfalls in the new roadbuilding program. In the anxiety to get projects started, state officials might make unwise compromises and try short-cuts in planning, he said. "There also will be the temptation to over-build, to provide more costly structures than are required because the federal government will pay 90% of the cost." He urged that roads be carefully tailored so that they will be "adequate but not extravagant."

Senator Edward Martin, Republican of Pennsylvania, at the general session, called for a reduction in the number of governmental units dealing with highway problems. He noted that in the 48 states more than 46,000 civil subdivisions have some jurisdiction over streets and roads. By cutting some of this "obvious overlapping and duplication," the Senator said, a more orderly and less costly highway program will result.

• **AASHO president-elect, W. A. Bugge, director of highways, Washington state. Bugge has served as president of the WASHO and has been an active civic and professional leader; recently chairman of AASHO's committee on design policies.**

Rex M. Whitton, Missouri state highway engineer and retiring president of the Association, read a message from President Eisenhower that commended the group for its assistance in preparing the 1956 Federal Highway Act. The President predicted that the program would "bring to Americans highway facilities which are safer and cheaper than any we have known before."

• The technical sessions at Atlantic City were characterized by one observer as the best planned and most down-to-earth of any in recent years. Particularly noteworthy were the sessions on maintenance and equipment (including a panel on expressway maintenance and operation); the two on traffic problems, which centered on the new electronic devices and on interstate highway control problems; radio in highway departments, which brought out a wealth of detailed experience on new electronic computers for structure design, earthwork computation, and other work; and administrative practices.

A few of the many session papers and panel discussions are touched on here:

Construction Problems. A construction committee session, under committee chairman N. L. Ress, Nebraska, with A. C. Clark of the Bureau as secretary, brought out much comment of interest to contractors as well as engineers.

The problem of getting contractors to do their own detour signing was covered by C. A. Wilson, District of Columbia. He told of the difficulty in attracting bids from contractors, bids having been withdrawn and re-advertised on a different basis for this reason. This subject provoked a lively discussion from the floor:

1. R. G. Stapp, Wyoming, reported that his state had excellent construction signs and barricades, copied from Bureau standard designs, but that all states need to adopt uniform signing to better protect the public and the workers.

2. In Iowa, as reported by C. L. Gleason, the state relieves contractors of the responsibility of maintaining construction protection mile by mile, as the job is brought to the completion stage, thus reducing the contractor's liability. There is still the problem of keeping motorists from turning onto completed new pavement when the barricades are taken down from cross-road intersections; such traffic is a hazard if clean-up work is still in progress.

• 3. Flagging in relation to traffic through construction got its usual airing. Minnesota, according to a delegate, is considering a flag substitute consisting of a portable, pedestal-mounted sign reading "Stop" on one side and "Slow" on the other.

Virginia reportedly has used such signs on both construction and maintenance. Nebraska has tried pedestal-type flags on signs, but found them difficult to handle in a high wind.

4. Uniforms for flagmen were urged by an Ohio spokesman, who said that in his state a local deputy sheriff or constable is often given the assignment to direct traffic. The uniform helps make motorists obey.

5. Flagging is now a separate pay item in more states. For example, in Nebraska pay-item flagging is done on the extensive cost-plus shouldering in progress there. Some contractors who considered Sam Brown belts unsatisfactory (get dirty too easily) have found it effective to buy red shirts for their flagmen.

6. Rented blinker-equipped barricades have made their appearance in Nebraska, this session brought out, but some engineers are dissatisfied with this equipment because the blink is too brief to constitute an effective warning device. Flares should not be eliminated when using blinkers, said this commentator, since flares convey their own message and are usually quite reliable.

"The little amber blinker is too small," added an Iowan man, "the blinker should be 6 in. instead of 4 in. size for highway work."

• *Ohio Contractors Set Own Stakes.* Contractor-performed stake-out work in Ohio was reviewed by Howard R. Craig, engineer of construction, Ohio department of highways, speaking at the construction committee session. Noting Ohio's sharply increased highway construction volume, he said that this expansion has been handled by little increase in personnel, thanks to numerous short cuts. One means of keeping the work load in hand has been to turn more engineering detail over to the contractors. This has worked very well, said Craig, the only problem introduced being one involving an attempt to unionize the contractors' engineers. The matter was settled with agreement to unionize rodmen and chainmen but not engineers.

With this background, Craig described the staking-out procedures in his state. Beginning in June of 1954, staking was required to be done by the contractor but not as a pay item. This arrangement proved unsatisfactory and the state changed it to a lump-sum bid item, which has been the custom ever since. Today the state engineers (or the consultant) furnish the contractor all control points and necessary bench marks. It is then the contractor's responsibility to furnish slope stakes, grade stakes, etc., and set sufficient stakes to define the right-of-way.

"We found many bugs when we first started this procedure," noted Craig, "but time and experience have eliminated these. We find that most of our larger contractors have organized their own engineering forces, which has worked very well, as we only use this method on large projects which lends itself to this method. The contractors are opposed when the demand is not sufficient to maintain their crews.

• "The contractor is not limited to the state's salary schedules; therefore, he is competitive to private industry, which the state is not. We have lost some personnel but not to the extent that would normally be expected," added Craig.

"The old cry of the contractor to keep grade stakes out ahead has become eliminated. The contractor generally likes this as it gives him better control of his operation. We feel this move has helped us to a limited ex-

(Continued on page 80)

Bugge Heads AASHO for 1957

President: W. A. Bugge, Director of Highways, Washington.

1st Vice-President: C. R. McMillan, Chief Highway Commissioner, N. Carolina.

Regional Vice-Presidents: J. N. Robertson, Dist. of Columbia; W. M. Leech, Tennessee; John Butter, Iowa; Geo. T. McCoy, California.

Executive Committee: Rex Whitton, Missouri; D. C. Greer, Texas; J. A. Anderson; Virginia; John Morton, N. Hampshire; C. D. Curtiss, Bureau of Public Roads; R. D. Bartelsmeyer, Illinois; D. H. Bray, Kentucky; Mark U. Watrous, Colorado; T. C. Robbins, Mississippi; L. H. Rees, Nebraska; John W. Johnson, New York.

Purchase Graders on Blade Pull Basis

The idea of using the power delivered to the blade as the basis for evaluating and purchasing motor graders was advanced by H. A. Radzikowski, chief, maintenance branch, Bureau of Public Roads. Noting that nearly 53,000 motor graders are in use by maintenance departments and contractors, this speaker said that a more uniform and rational method of classifying various models for purchasing would profit everyone.

Currently there are many debates over whether to purchase the so-called light, medium or heavy graders. Weight isn't a fair basis for deciding on the best machine for a purpose, nor is horsepower since too much power in relation to weight may be wasted at the blade. The work that can be accomplished by a grader is directly dependent on the power that can be exerted at the moldboard. The Bureau has been delegated to develop standard specifications for all classes of motor graders, for all federal agencies as well as those dealing with highways. A review of existing specifications reveals that the historic emphasis on brake horsepower needs modifying, especially in light of new engine developments, torque-converters, higher-speed engines, and other factors.

A test in Nebraska indicates that drawbar pull is a practical indicator of a grader's usefulness, and other tests to develop further data are sought.

It's the hard work that separates the "men" from the "boys" in construction equipment. Faced with their greatest construction challenge in history—the 41,000-mile Interstate Highway System—contractors must depend on "men" if they are to get the job done profitably, and get it done on time.

Any machine can do a passable job when the going is easy. But this challenge involves *hard work* . . . the kind that tests the ability of equipment to produce. That's the kind of work that made Caterpillar-built machines the leading equipment used by contractors. CAT® units are designed and built for money-making performance under the toughest conditions. Where the going is roughest, Caterpillar

equipment gets and handles the job. Got some hard work to be done? Give it to the machines that want it, like it and can do it profitably for you—Caterpillar-built machines!

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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HEAVY-DUTY MACHINES FOR THE HARD WORK

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

. . . for more details circle 206, page 16

TS-18 "Eucs"

TWIN-POWER SCRAPERS get more work done... *faster*

Twin-Power—two engines driving separate axles—was pioneered by Euclid 10 years ago. Torque converters and semi-automatic transmissions assure easy operation and a smooth flow of power matched to any job condition. The TS-18 is powered by two 218 h.p. engines with a 300 h.p. engine for the tractor available for work where maximum power can be used. Standard tires are 27.00 x 33 with 33.5 x 33 as optional. Harris Construction Company's "Twins" are TS-18 Specials with 518 h.p. and the larger tires.

With a total of 518 h.p.—300 h.p. in the tractor and 218 h.p. in the scraper—Harris' TS-18 Specials really made the dirt fly and completed the Glasgow Air Force Base grading weeks ahead of schedule.

Harris Construction Co. of Aberdeen, S. D. recently set a new record for earthmoving on Montana highway work with a fleet of six TS-18 Euclid Scrapers. In a six-day work week these "Eucs" moved 90,000 cu. yds. on a half million yd. road contract near Nashua on Route 2. They worked 10 hours a day—self loaded gravel, clay and shale without pusher tractors—on hauls averaging 1500 ft. Most of the time each machine worked alone making shallow cuts and fills on sections of the 13-mile job.

At nearby Glasgow Air Force Base, Harris used his original fleet of four TS-18 "Eucs" to move most of the 1,200,000 yds. of gumbo. Working two 10-hour shifts 6 days a week, each scraper averaged 69,000 yds. a month. Performance of the "Twins" on this air base job was so outstanding that 2 more were added to the Euclid fleet—and Harris has disposed of 8 other scrapers and 5 crawler tractors.

With two jobs only 26 miles apart the mobility and independence of the TS-18 Scrapers proved a big advantage. They moved from air base to road job and back again—as conditions required—in about an hour. There was no problem or expense in moving pusher tractors because none were needed at either job. And when a few loads of sand or gravel were needed for culverts or other use, a "Twin" or two took off for the nearest pit and did the job in a hurry.

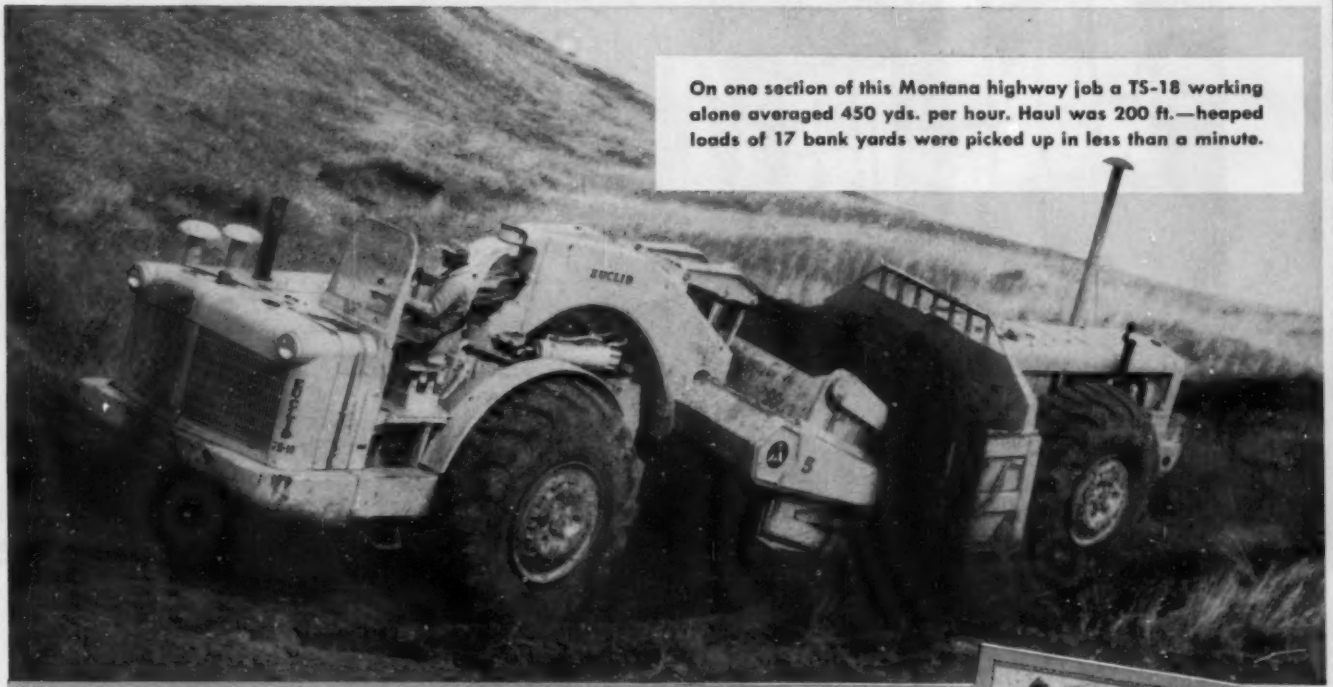
Owner Ken Harris has found the Twin-Power Scraper the most efficient dirt mover he's ever used. His fleet with job availability of 95% has more than lived up to his expectations in production and low cost yardage. That's why he tells visitors to his jobs, "When I buy additional haulage equipment it'll be TS-18 'Eucs' ".

For information on the complete line of Euclid earthmoving equipment, call your Euclid dealer—he can show you why ***Euclids are your best investment.***

EUCLID DIVISION, GENERAL MOTORS CORPORATION, Cleveland 17, Ohio

set new earthmoving records

. . . complete tough jobs way ahead of schedule



On one section of this Montana highway job a TS-18 working alone averaged 450 yds. per hour. Haul was 200 ft.—heaped loads of 17 bank yards were picked up in less than a minute.

The 33.5 x 33 tires and NoSpin differentials of the TS-18 Specials provided the tremendous traction needed for self-loading the heavy gumbo and gravel and made efficient use of the 518 total h.p. on both of the Montana jobs.

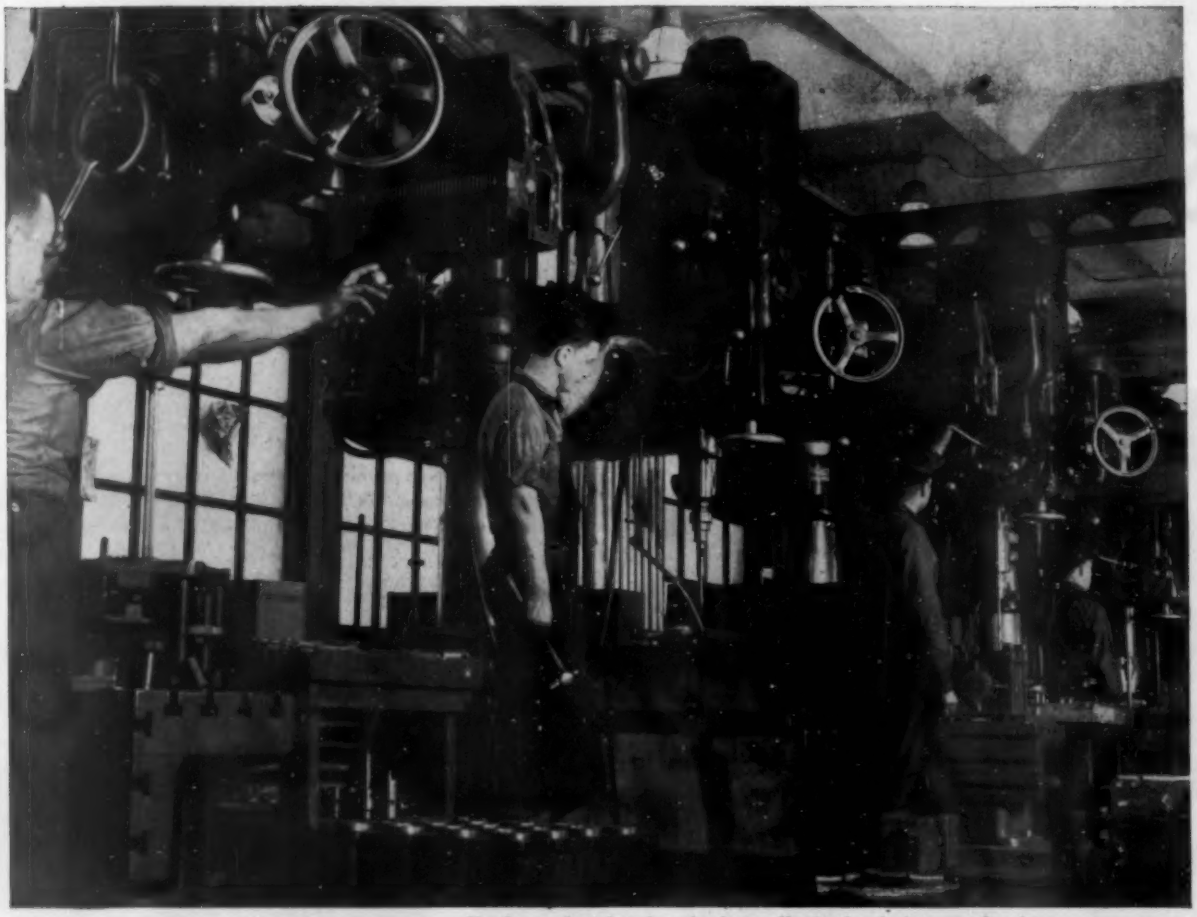
Ken Harris, head of Harris Construction Co. in South Dakota, says "the complete independence of the 'Twin' is revolutionizing road building on many jobs where concentration of equipment in any single cut is not practical." He's standardized on the TS-18 Special for his earth-moving equipment.

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE

. . . for more details circle 290, page 16

RAW-KNOX BITUMINOUS PAVER FINISHER



They're on the job today, thanks to effective local winter road maintenance programs.

Ice on the roads, men on the job

Snow and ice struck late yesterday. Streets, roads and highways almost instantly turned treacherous. It looked bleak . . . for local plants' production schedules, for lost wages of workers kept off the job. It's often worked that way in the past.

But someone did a vital job through the cold hours last night and early this morning. You and your crews spread Columbia Calcium Chloride treated abrasives on those slick surfaces. Within minutes, safe travel was possible. Treated with this skidproofing chemical, abrasives bit into ice and packed snow with hungry vigor . . . didn't blow away before the surfaces became safe, as untreated materials do.

You saved time and expense in loading and spreading, too; Columbia Calcium Chloride kept your cinder and sand stockpiles loose, freeze-proof. And finally, you figured that each load of your treated abrasives covered fully three times as much actual surface as an untreated load used to.

Your stock of Columbia Calcium Chloride may be a little low today. Why not order an ample supply right now through your nearest Columbia-Southern district office? Any that remains after you've beaten winter's last attacks won't be wasted . . . you'll be using this versatile chemical soon enough to recondition unpaved roads.

Safeguard winter traffic with Columbia Calcium Chloride

Columbia Calcium Chloride is now also available in High Test Flake (95-98% $CaCl_2$ content). One 80 lb. bag of High Test Flake does the work of a 100 lb. bag of Regular Flake (77-80% $CaCl_2$).

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

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. . . for more details circle 214, page 16

. . . for more details circle 290, page 16

BLAW-KNOX BITUMINOUS PAVER FINISHER
WINS WORLD-WIDE ACCEPTANCE!

Speed — accuracy — quality of production proved by use in 44 States, Five Provinces of Canada and many Foreign Countries

Owners of Blaw-Knox PF-90 Bituminous Paver Finishers in all parts of the United States, Canada and in many foreign countries are depending on them to give top quality bituminous paving at the lowest cost per yard. After its preliminary testing and development period and only 2 years on the market, this paver has proved to owners that they are getting a *better surface at higher speed and lower cost.*

Long wheelbase and accuracy of steering, possible only with wheels, produce a smooth ripple-free surface under the straight edge and even control on curves. Rubber tired mounting definitely reduces the time required for returning the machine for restarts. Rubber tired mounting also reduces maintenance by eliminating 500 to 600 exposed metal wear parts and by absorbing vibration which cause wear and tear on a machine.

No matter where your next asphalt paving job is located you can be sure that no other machine can match the combination of speed and results of the Blaw-Knox Bituminous Paver Finisher. See your nearest Blaw-Knox distributor for complete details.

Want a paver for smaller paving jobs such as driveways and parking lots? Send for Bulletin 2539. It describes the New Blaw-Knox Model PF-45 Black Top Paver.

. . . for more details circle 301, page 16

BLAW-KNOX COMPANY

Construction Equipment Division

44 Charleston Ave., Mattoon, Illinois

Ohio Contractors Snapped Up

APPLYING SALT About 16 tons per mile usually. These photos, courtesy Ohio Department of Highways, show typical steps as seen on various contract jobs.

State offered 25 "purchase order" contracts under maintenance department in 1956 early-season "Quickie" program. Marked new step in economical improvement of light-traffic secondary roads in state.

DURING May and June of 1956, twenty-five contracts for stabilizing secondary road sections with rock salt were cleaned up by a score or more contractors, in a program that seems to have worked to everyone's benefit.

The contractors took the work as a "fill-in" item in nearly every instance, the work being intentionally planned as a pre-season effort, giving contractors a chance to sandwich the work in with other jobs in progress or being lined up for the season. Bids well below the estimate reflected a good response despite the fact that this was a new type of work for Ohio contractors.

Salt stabilization is a recent development in the state. The highway department experimented in 1954 by building four sections with maintenance forces for the purpose of determining methods and specifications, and testing the results through a winter or two. The idea was seen to have promise in reducing maintenance and improving driving conditions on the 800 miles of traffic-bound light-traffic stage roads existing on Ohio's secondary system, where low cost stabilization is the key to highway betterment.

These experimental sections came through the 1955-56 winter with a good showing. On this basis and in light of experience with salt stabiliza-

THE PROBLEM Raveled, pot-holed bituminous mats looked like this on many of Ohio's lightly-traveled secondary roads. Low-cost base stabilization, the first need.

FIRST STEP Existing mat and underlying material scarified with motor grader teeth.

Late-Spring Salt Stabilization Jobs

BARE GRADE Scarified material has been bladed to shoulders, leaving a clean grader.

NEW AGGREGATE From 300 to 750 cu. yd. per mile of stone, gravel or slag tail-gated.

tion in Illinois, Michigan and other states, highway director S. O. Linzell, working through C. W. McCaughey, deputy director, division of operations, asked the various division engineers to select sections on a basis of need. About 260 miles of projects in five divisions were selected, comprising 25 contract sections.

The sections chosen to be treated usually consisted of graveled roads with some bituminous mat which had become raveled and worn to the point where definite need of strengthening was indicated.

In selecting the sections to be improved, the division maintenance engineers often indicated roadbed areas ranging from 100 ft. to several hundred feet, to be skipped in the stabilization work because of their present satisfactory condition.

● *Simple Bid Details.* The invitation for bids sent out in April consisted typically of six or seven mimeographed form sheets on which were listed the bid items, estimated quantities and informal description of the work involved. The bid items were few and simple: reconditioning and priming the existing roadway; furnishing, hauling and tailgating new aggregate at a specified rate per mile; scarifying; pulverizing and adding sodium chloride; blending, and other processing, water for mixing; bituminous prime treatment and chip cover.

SALT "SANDWICH" Blading windrowed aggregate over a salt application, as one step in intermixing.

In making up this work, the engineers decided to forego formal tests, specific aggregate gradation and other details which would add to the engineering work involved, and which might result in a higher bid price from the contractors. As a guide, a simple typewritten document of two pages was prepared entitled "Construction Procedure for Modified Stabilized Base Course."

Bidding was spirited for all of the projects, since the work constituted an unexpected $870,000 windfall of jobs for Ohio contractors—jobs which usually could be sandwiched in with other work just getting started or not yet begun for the summer season. By the first week in July, nearly all jobs had been cleaned up and the contractors had moved out.

Under the directive covering general

PULVERIZING A power rotary pulverizing mixer shown here breaking up large chunks and aiding in blending in salt and moisture.

LAYING OUT Blend of rock salt, aggregate, soil and moisture being spread—see text for detailed procedure.

SPRINKLING This contractor used two water trucks in conjunction with rotary mixer and pneumatic roller.

procedure, the contractors were given maximum leeway in devising their own methods, but were supervised closely for moisture control and salt content. Supervision was done by four specially trained representatives working out of the maintenance division headquarters office at Columbus, under the direction of J. W. Reppel, chief engineer of maintenance.

Power-driven rotary type mixing machines were specified primarily for the purpose of breaking up the large chunks left by the scarifying operation, the idea being to perform most of the blending by motor graders.

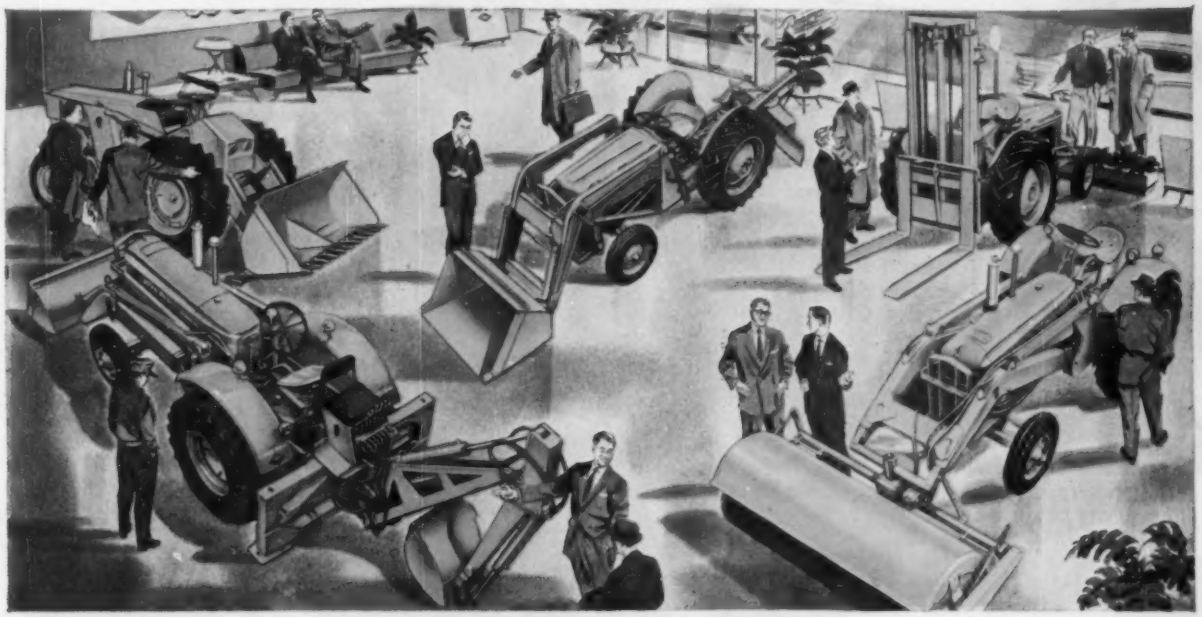
● *Step-by-Step Methods.* The typical procedure is outlined as follows:

1. The existing mat and roadbed material is scarified to a depth usually of about 6 in.-deep enough to get out the old crust and also provide some soil

(Continued on page 76)

FINAL SPREAD Nearing finish of the blading.

FINAL ROLLING In progress using self-propelled unit.



5 tractors, 20 interchangeable attachments

new family of power-matched packages

for scores of jobs

M-H-F WORK BULLS PAY OFF as high-performance, money-saving units for contractors, utilities, industry, municipalities

The reason — integrated design! Both tractors and attachments are designed for *multiple machine versatility*. For example — a Work Bull with a loader mounts interchangeable attachments that quickly, easily convert the same tractor into a highly efficient backhoe, fork lift, swinging crane, grader or any of many other highly efficient tools. And at a surprisingly low cost.

In five to 15 minutes you can mount or dismount any Work Bull attachment. Switching involves merely one man—no wrenches, no special gear. And front-end attachments utilize the same hydraulic arms and frame. Backhoe attaches or detaches in less than 5 minutes!

Work Bull attachments include the loader, blade, fork lift, mower, backhoe, snow plow, auger, broom, pipe and cable layer and others to meet your specific needs.

Get full details and the name of your nearest distributor. Write for 24-page catalog.

Enjoy the advantages of a single source, one responsibility for sales and service on both tractors and attachments!

M·H·F WORK BULLS

Division of Massey-Harris-Ferguson, Inc.

19-B QUALITY AVENUE • RACINE, WISCONSIN

. . . for more details circle 240, page 16

PRIMING Light surface mulch is primed to help hold until job cures out and seal can be applied.

DURING CURE PERIOD How a typical job looks during the week it is kept under constant maintenance until prime can be applied. A durable farm-to-market road for $3,500 per mile.

SALT STABILIZATION

(Continued from page 74)

materials to mix with new aggregate. The full roadway width of 16 to 18 ft. is loosened.

2. The loosened material, which may contain large stones and chunks of bituminous mat up to 5 or 6 in size, is broken up using a power-driven rotary pulverizer or other approved method.

3. The pulverized material is then windrowed to one side of the road, leaving the bare grade.

4. New material is tail-gated and spread over the grade, in quantities from 300 to 750 cu. yd. per mile. Material is required to consist of ¾ in. maximum well graded stone, gravel or slag.

5. Blending of old material with new then takes place. A typical recommended procedure includes several steps.

- Half the windrowed material is spread out over the new aggregate, using a motor grader.
- Rock salt is applied usually at the rate of ½ lb. per sq. yd. per in. depth of loose material. This runs 16 tons per mile for an 18 ft. width.
- The remaining half of the windrowed material is spread over the salt, to sandwich it in.
- The sandwiched material—old road metal, new aggregate, salt and more old metal—is mixed, making at least three passes of the mixing equipment. The sprinkler truck also makes passes as required to keep a proper moisture content. If there is too much moisture, as is often the case in early summer in Ohio, the mixed material is windrowed or given further mixing to dry it out.
- Next the intermixed material is built into a windrow located slightly to one side of the highway centerline. This is preliminary to laying out and compacting in two courses, as specified.
- Usually about 60% of the material is allotted to the lower lift. The grader operator spreads half of this 60% or about 30% of the windrow out on either side and rolling is done.
- The remaining 40% of the windrow is spread clear across, while compaction and necessary moisture replenishment continue until the job is done. Careful blading gives the road its final shaping.

6. The road is maintained under traffic for about 10 days, keeping a light mulch for good skid resistance. Blade maintenance during this time is continuous.

7. After the curing period, a light prime is applied consisting of about .035 gal. per sq. yd. of miscable emulsion, RT-2 or RT-3, or sometimes MC-0 or MC-1, and a 10 lb. chip cover is added.

The surface was maintained by state forces during the 1956 summer. A bituminous seal was added later in the year under separate contract. Asphaltic mix for a heavier surface will be placed within highway allocations as required.

The afore described typical step-by-step procedure is usually carried out in work sections varying from 3,000 to 5,000 ft. and single-lane traffic maintained at all times. The length of the work laid out depends on the time required for the drying out or curing. The daily progress of the contractors has been such that a 5-mile job is usually handled in about 12 working days, within a period of 2½ weeks.

- *General Observations.* The principal concern of the inspectors has been the moisture control. The inspectors were taught to recognize by eye when the right moist-but-not-wet condition prevails, at which point the mix is just right for effective compaction, part of the indoctrination of these inspectors was gained by observance of the earlier experimental sections during and following their construction. A tell-tale sign of too much moisture, such as often occurred when rain fell during the work, is the appearance of white streaks of salt coming up through the prime. Too little moisture,

(Continued on page 110)

City of Dearborn, Michigan, Saves Money With Sherman Digger-Loader

The City of Dearborn's Water Department has found its Sherman Major Digger-Loader combination to be one of the most versatile pieces of equipment it owns.

The Sherman unit is used almost continually for pipeline construction work, laying water lines, setting fire hydrants, and for repairing and maintaining water and service lines to homes.

Once the excavation is completed, the Loader takes over. Loading trucks with a fast cycling Sherman Loader, cleaning up around a job, backfilling, grading and levelling, stripping . . . all are performed quickly and economically with the same basic piece of equipment which was used to dig the hole *and* by the same operator.

As Mr. Molner, the operator, puts it, "We couldn't do the jobs we are doing with any other machine. We've got to have the power and strength the Sherman Major offers to dig as hard and as deep as we do. We also use the unit to load our machinery on and off the trucks, to lower pipes and hydrants into trenches and holes, etc."

Other cities, too, are finding out how this *economical* Digger-Loader combination can save them money. Call your local Ford Tractor dealer today or write for Bulletin No. 3557.

See the Sherman
Power Digger soon
at your local
FORD TRACTOR DEALER

Sherman
PRODUCTS, INC.
ROYAL OAK, MICHIGAN
POWER DIGGERS* • FRONT END LOADERS • FORK LIFTS

*Designed, Engineered and Manufactured jointly by Sherman Products, Inc., Royal Oak, Michigan. Wain-Roy Corporation, Hubbardston, Mass.

. . . for more details circle 245, page 16

Leading Fleet Owners Depend . . . on Manitowoc

All over the country leading contractors have come to depend on Manitowoc for big, steady production, rugged service and long-life. Dozens of repeat sales to fleet owners prove that superior Manitowoc performance leads to additional orders when the purchase of new machines is considered.

Manitowocs are the choice of successful contractors because there's greater utilization of engine power through direct power flow to the dipper. As a result, operating cycles are faster . . . help to finish jobs ahead of schedule. This simplicity of design cuts down on the number of moving parts, keeps downtime negligible. Smaller rigs in the line offer greater weight with the lowest cost per pound of machine in the industry. Larger units like the 5½-yd. Model 4500 shown above have the beef and brawn needed for the big, tough jobs, yet are as mobile as a small excavator. Best of all, quality of Manitowoc construction matches quality of performance.

Join the growing list of earthmoving men who pick Manitowoc for profit. Before you bid your next job be sure to investigate all the Manitowoc advantages — you'll be glad you didn't settle for less!

Manitowoc Engineering Corp.
Manitowoc, Wis.

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MANITOWOC
SHOVELS 1-5½ YD. Shovelcrane CRANES 20-100 TON

Proof of Performance!

Some Nationwide Manitowoc Fleet Sales

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Merritt-Chapman & Scott Corp.
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The Lummus Company
Booth & Flinn Co.
Chicago Bridge & Iron Company
Altoona Construction Co.
The A. Bentley & Sons Co.
O. W. Burke Company
Bushman Construction Co.
Nicholas Fornabai
The Foundation Company
McCarrick Brothers, Inc.
A. I. Savin Company
Tidewater Construction Corporation

. . . for more details circle 275, page 16

How to put limestone and gumbo in their place

THIS is heavy going on a new section of four-lane U. S. 80 just east of Ranger, Texas. Collins Construction Co. of Austin put in 7.8 miles here and they handled 395,000 yards of material doing it. A lot of that was rock. And a lot was limestone and gumbo.

For this sort of heavy grading, Collins called in their CAT* No. 12 Motor Grader. "Finest all-around grader I ever saw," says veteran operator V. W. Nichols.

Notice that operator Nichols sits down to handle his No. 12, even in rough stretches like this. If an operator has to stand to see his work, he tires much quicker, no matter how good he is. The operator of a No. 12 enjoys the convenience of in-cab starting, too, and power steering, and the exclusive Caterpillar accelerator-decelerator. Most of all, he enjoys the assurance he's at the controls of a tough, reliable machine that's *built to do the hard work.*

Backbone of the No. 12 is the strongest frame in any motor grader now on the market. Special channels make it that way. Box section circles increase its durability, as do its box-type drawbars. And the engine is of the same hardy breed—clutch, transmission, final drive are built to take heavy motor grader service.

Other features help explain the No. 12's popularity with operators and owners, too. Fast, accurate mechanical controls. Anti-creep brakes. Blade maneuverability that lets you swing from ditch cut to bank cut in less than a minute without adjusting links. Your Caterpillar Dealer will give you full details—and a demonstration, any time. He's ready with expert service, also—and parts you can trust.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

WANTED—
THE HARD WORK

Diesel Engines • Tractors • Motor Graders • Earthmoving Equipment

. . . for more details circle 205, page 16

Miscellaneous AASHO Convention Items

● *Traffic Control Project.* A million-dollar test project to develop new methods of traffic control on urban expressways, was recommended by Alger F. Malo, traffic director of Detroit. The proposed year-long study would be carried out with the help of latest electron controls plus television closed-circuit observation. The 14-mile completed portion of Detroit's expressway system was recommended at the proving ground.

● *Driver Rest Stops.* More opportunities for motorists to stop frequently and rest were urged by B. D. Tallamy, as a major design element in planning interstate relocations. Experience on the New York Thruway, said Tallamy, has shown that fatigue is a factor in many accidents.

● *The right-of-way fencing problem* was also touched on by Tallamy for such facilities. The cost of fencing long stretches of inter-city expressway in very high, and on the 427-mile N.Y. Thruway only certain parts were fenced. Continuous fencing for the Thruway would cost a million dollars a year just to maintain, he said. Yet fencing is vitally needed to control pedestrians in many areas.

● *New-Style Diversion.* A new form of diversion of highway funds was brought up by G. Gordon Love, maintenance engineer, Massachusetts. He reported a serious and growing use of highway funds to maintain state-owned institutional grounds and roadways, and also forest recreational roads and other roads not on the state road system.

"LET'S GET ROLLING"

(Continued from page 65)

tent; however, we will be glad when the time comes that we will have sufficient well-trained personnel to perform the duties that should be done by the state."

● *Expressway Maintenance and Operation.* A symposium on this subject in one of maintenance sessions, with Rex M. Whitton (Missouri) as chairman and H. A. Radzikowski (BPR) as secretary, drew a large audience. Charles W. Noble, chief engineer, New Jersey Turnpike, said that long-distance, controlled-access facilities now on the drafting board introduce a new concept of maintenance and operation. The problems will be especially acute in urban areas. The highway official will have the public in his care as *customers*—a new and challenging role, involving the planning for many services and necessities hitherto considered beyond the field of the highway department.

Express highway operation, said Noble, includes activities which are, up to now, handled by various and often uncoordinated agencies. Some of the items:

• Traffic operations, including safety surveillance, safety programs, accident investigation and analysis, development of safety measures, signs, signals and markings, accident statistics and reporting.

• Policing: accident prevention, enforcement, aids to motorists, crime detection.

• Communication: radio, television, roadside public telephone.

• Service: fuel, oil, water, telephone; comfort, food, repairs, flat-tire service, towing, ambulance, medical aid, overnight accommodations.

Speaker Noble noted that while much experience has been gained in toll road operation, the relocated Interstate System routes will have the important difference of being freeways, without the economic necessity (to the agency) to develop self-liquidating revenue from highway-user services. There will be the need to utilize existing private facilities to the fullest, while encouraging new facilities. This will require informed planning and community cooperation. The schemes worked out will need to be tailored to the needs of the locality traversed.

• Traffic engineers and their departments, as now set up within the state road agencies, will have challenging new responsibilities and problems, said Noble. A period of pioneering is with us, too, he inferred, in the evolution of roadside services, such as gas, oil, repairs, food and comfort—things for which the motorist is loath to detour via the expressway's ramps and interchanges. These services must be supplied in cooperation with community enterprise and under design standards which insure safe ingress and egress from the main traffic stream.

Next panelman, B. D. Tallamy, who headed the New York Thruway until taking over as federal administrator, said that now is the time to lay plans for the new kind of operation required for the access-controlled interstate relocations. "The sooner the better, so that we can begin to cut the accident record and give the public the service it expects." Otherwise, he said, the vast and costly Interstate highway program will not lead to a reduction in the accident rate.

● Tallamy noted that more safety data are needed on the new motorist's problem of having to drive long distances over continuously high-speed expressways between cities. People with poor driving habits must be studied, and eventually controlled. The reward for all-out accident prevention effort, combined with access controlled design, will be a fatality rate below 2.0 per 100 million vehicle-miles. (Various turnpikes today have rates ranging from 2 or less, to 6, the national highway rate being about 6.)

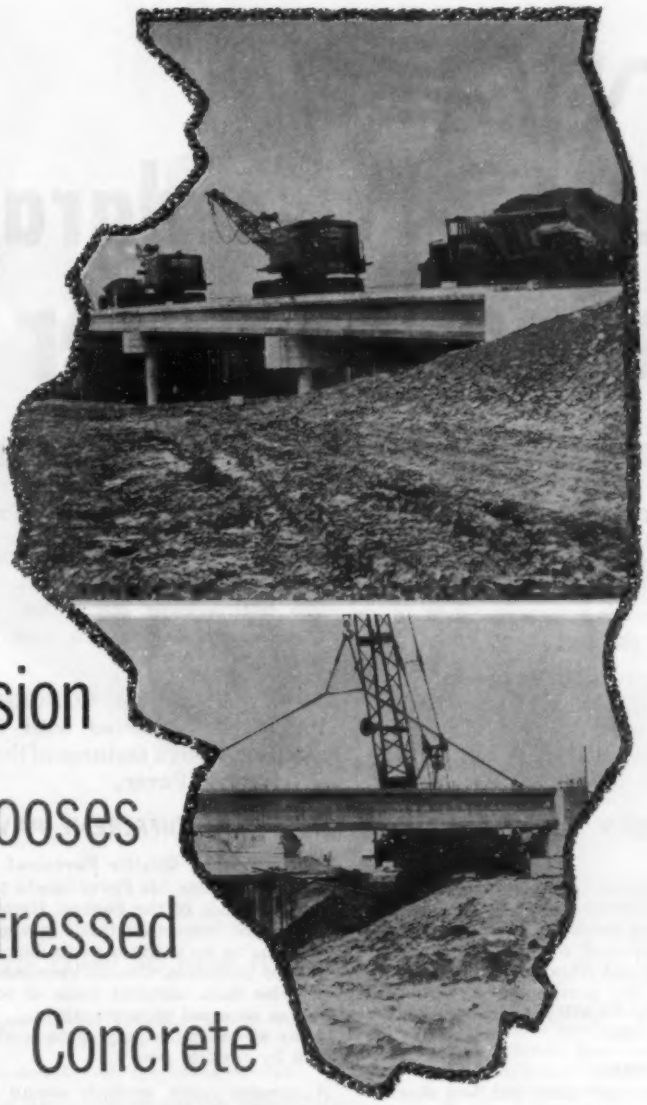
The winter maintenance problem for expressways was also noted by Tallamy. People in the northern states have come to expect all-winter highway service. In 1955, the Thruway used 40,000 tons of salt on 424 miles of its line. A special snow plowing procedure has also been developed to keep the roadways cleared under traffic, with minimum hazard or inconvenience.

Mowing on the Thruway's wide righ-of-way has proved to be a costly item. The present practice is to concentrate on the mall and to mow only 20 ft. width along the outer shoulders. The huge interchange acreage has posed a special problem, and some economy as well as beautification has been achieved by cooperating with local garden clubs to get shrubbery and small trees planted, where sight distance is not reduced.

The specialized operating problems of metropolitan New York's facilities were reviewed by the third panel speaker, Charles H. Taylor, director of tunnels and bridges, Port of New York Authority. Providing sufficient peak-hour capacity was given as a principal need in planning. Mr. Taylor's paper, which reviewed progress in enlarging Lincoln Tunnel and other recent efforts, also mentioned the prevalence of rear-end collisions on bridges and high-speed expressways. Remote-controlled neon signs and a public address system have been used with success on the George Washington Bridge to advise patrons of unusual conditions ahead and encourage spacing out of traffic. Bridges and tunnels are constantly patrolled by

(Continued on page 94)

Illinois State Toll Highway Commission chooses Prestressed Concrete for 212 Bridges!



Overload test of Beverly Road Bridge. Four spans, continuous under live loads, center to center of piers measured along center line of girders are: 42'-10"; 70'-5"; 70'-5"; 42'-10". Skew is 20°. Precast prestressed I-section girders—without intermediate diaphragms—are 48" deep and placed 7'-6" center to center. Precast, pretensioned 2½" deck slabs were placed on the girders with a 5" slab poured on top. Intermediate piers are 36" diameter prestressed hollow piles with 4" walls.

Girders and 2½" slabs for the test bridge made by Prestressed Concrete Structures of Frankfort, Illinois, using Roebling 7-wire stress-relieved strands.

Placing 42'-10" span girder on Beverly Road Bridge.

Write for your free copy of Roebling's 16-page booklet, "Tensioning Materials for Prestressed Concrete."

This choice is the result of exhaustive research together with testing of the continuous type of prestressed structure which was adopted. Initial cost, efficiency, delivery and maintenance were factors that governed the final choice...and each was more successfully met by prestressed concrete than any other type of bridge.

The initial cost of the prestressed concrete design is appreciably lower than with existing alternate designs and materials.

Dynamic tests on the Beverly Road Bridge proved conclusively that the prestressed method means less vibration and deflection under high-speed traffic—two factors which are cause for increasing complaints on other types of bridges.

The faster delivery (first bridge will be delivered about 5 months after bidding) will reduce cost of other construction operations because these bridges can be used for access to uncompleted highway sections. Highway can begin collecting tolls on completed sections sooner.

Prestressed concrete requires no painting – repair and maintenance costs are less. The 212 bridges in the Northern Illinois Toll Highway will have a total of 6300 prestressed girders varying in length from 40 to 90 ft. Bridges are designed by Joseph K. Knoerle and Associates, Inc., Baltimore, Maryland.

For data on tensioning elements, casting yards, fabrication methods, design procedures and other prestressed concrete information, write Construction Materials Division, John A. Roebling's Sons Corporation. Trenton 2, New Jersey.

ROEBLING

Sales Offices in Principal Cities

Subsidiary of The Colorado Fuel and Iron Corporation

. . . for more details circle 244, page 16

The NEW cedarapids bituminous paver

introduces an entirely new concept in bituminous paving

Imagine a bituminous paver *with an electric vibrating* screed and a *controlled vibration intensity* that not only compacts bituminous mix into a smooth, uniform high-density mat, without segregation . . . but is setting new records for high-speed, high-capacity paving!

Imagine a bituminous paver that has *placed material from ten 14-ton trucks in 15 minutes* . . . that can hit paving speeds up to 102 ft. per minute . . . with the finished pavement free of voids or tears in the mat, and testing as good as pavement laid at much slower speed!

Imagine a machine so simple in design and so ruggedly built that a test model operated for 935 hours, over 385 miles, *with practically no mechanical difficulties*, and showing very little wear!

THAT'S THE NEW CONCEPT IN BITUMINOUS PAVING . . . achieved with the many new and different design features of the all-new Cedarapids Bituminous Paver.

HERE'S HOW YOU PROFIT WITH THIS NEW, DIFFERENT PAVER

Greater Speed and Capacity
Tests have proved that the paving speed and capacity of the new Cedarapids Bituminous Paver are generally limited only by the output of the mixing plant, truck movement, or the ability of the rolling equipment to keep up. Paving speeds range up to 102 FPM. Rapid vibration of the screed assures maximum density at any paving speed, without tearing the mat or creating voids. Capacity is conservatively rated in excess of 200 tons per hour.

Simplified for Lowest Maintenance
Simplified design means more "go" time and less down time. A number of troublesome chains, drive shafts and universals have been eliminated. This reduces the number of wearing parts and mechanical drive linkages required. See the table for comparison with other leading pavers!

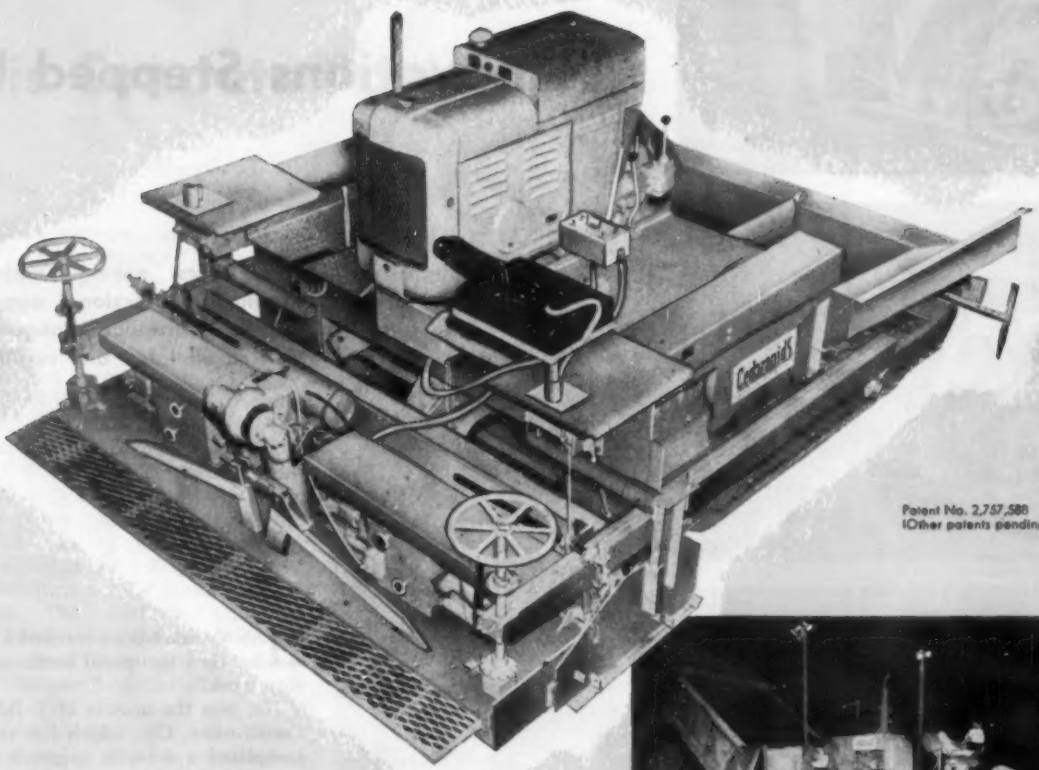
	Chains	V-belts and drives
Cedarapids Paver	6	2 belts with 1 drive
Paver A	15	5 belts with 5 drives
Paver B	12	10 belts with 4 drives
Paver C	17	9 belts with 3 drives

Assures Better Quality Pavement
The new Cedarapids Paver meets the most rigid specification demands of the Federal Highway Program. On turnpike tests, inspectors found paving mixes spread by this machine to be uniform as to density, surface texture and desired thickness. Careful examination of dozens of density samples from unrolled areas of both binder and surface course revealed no segregation . . . neither open textured areas where coarse aggregate predominated, nor segregation by particle size.

Automatic depth controls assure the proper amount of material in front of the screed at all times with no attention from the operator . . . an important feature for preventing voids when paving at high speed. Steering is easy. Long screed support arms pivot well forward on the Paver, with a ball joint connection which allows minor side movement of the screed to assure straight mat edges and even joints on the straight-away as well as on curves. The long screed arms and long crawler base provide maximum screed floating action to minimize irregularities in the subgrade.

These exclusive Cedarapids design features result in highest quality pavement, with the riding quality demanded by safety for today's high speed travel.

These pavement cross sections are typical random samples cut from both binder and surface courses of the Kansas Turnpike. Such uniform distribution of coarse and fine aggregate is typical of pavement laid with the new Cedarapids Bituminous Paver.



Patent No. 2,757,588
(Other patents pending)

TESTED AND PROVED
ON THE KANSAS TURNPIKE

This Cedarapids Paver was used by Reno Construction Company to lay 130,000 tons in a little over two months on the Kansas Turnpike. Operating day and night, the Paver laid 3,475 tons, or all the mixing plant could supply, in one 16-hour period. Note the relaxation of the operator. Finger-tip operation, with no foot controls, adds to the Paver's easy handling.

HERE ARE A FEW OF OVER 40 NEW FEATURES

- Four individually controlled, electrically driven vibrators deliver 3,600 impulses per minute to screed.
- Automatic feed conveyors and spreading screws.
- Completely self-cleaning track-type crawlers reduce maintenance, prevent screed-disturbing build-up of material.
- Big hopper handles up to 9 tons of material.
- Paving widths easily adjusted . . . no tamper or cut-off bar to consider.
- Electric clutches and brakes minimize wear.

. . . for more details circle 306, page 16

IOWA
MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Cedarapids
Built by IOWA

IOWA MANUFACTURING COMPANY, Cedar Rapids, Iowa, U. S. A.
Gentlemen: Please send Bulletin PAV-1 and further details of your new Bituminous Paver.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Innovations Stepped Up

New high-speed truck hoists, novel combination finisher and bullfloat machine, sectional aggregate batching tunnel, subgrader with quick-change crown —among devices which saved labor and resulted in high daily runs.

Fast Hoisting

Seconds were clipped off the hoist-dump-back-up-and-lower cycle by a new hoist developed between contractor and manufacturer.

HAS the limit been reached in gearing up a two-paver outfit on highway work?

No, was the answer of J. A. Jones Construction Co., which has recently completed a 4.8-mile segment of the new U.S. 30 bypass around Mansfield, Ohio. By adding several equipment innovations to the firm's already fast-paced organization, this contractor substantially completed all grading and paving by the end of the 1956 season, despite serious delays due to wet summer weather.

The project in question is a typical dual highway, which besides bypassing Mansfield, will serve as an access road to a new $38 million General Motors plant. Representing the latest arterial design standards of the Ohio state highway department, the job includes three interchange structures, which were subcontracted. The $2,741,000 package contract included grading, which was routinely handled, and 209,000 sq. yd. of reinforced concrete pavement representing 8.3 roadway miles of 9" x 24' slab.

The paving crew, working 9 hours without lunch stop, averaged 200.7 ft. of 9" x 24' slab per hour of paving operation in the period from first pour in September to November 18. Hourly paving progress often exceeded 250 ft. to 270 ft., with peak days of 2,500 ft. or more of full-width slab in 9 hours' paver time.

Paving began on September 17 with two Rex 34E dual-drum pavers. Most of the equipment consisted of standard familiar items. But four distinctly new units helped maintain this fast pace:

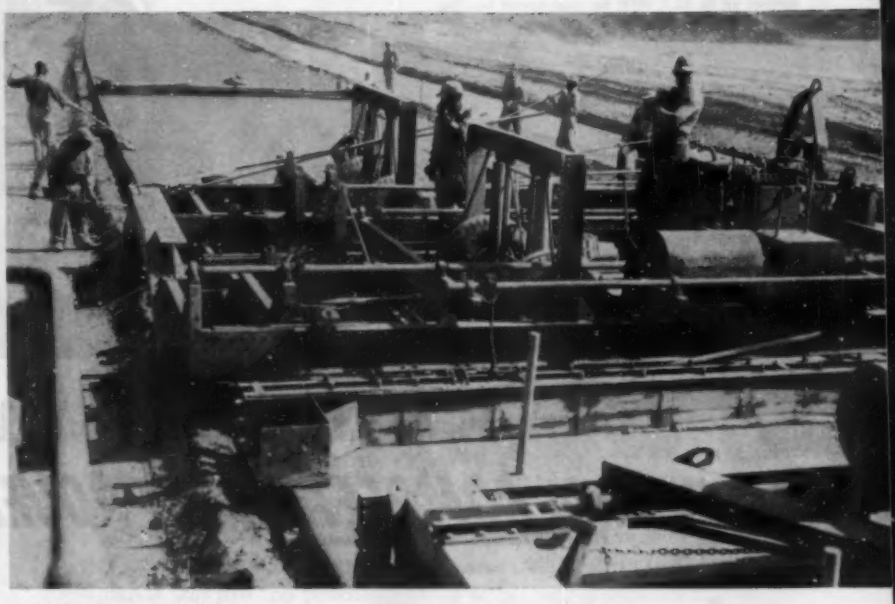
Portable Aggregate Tunnel

It's a buried culvert under the stockpiles—but with a difference. The culvert is a sectional, prefabricated job, complete with crane lifting hooks for quick disassembly and haul-away.

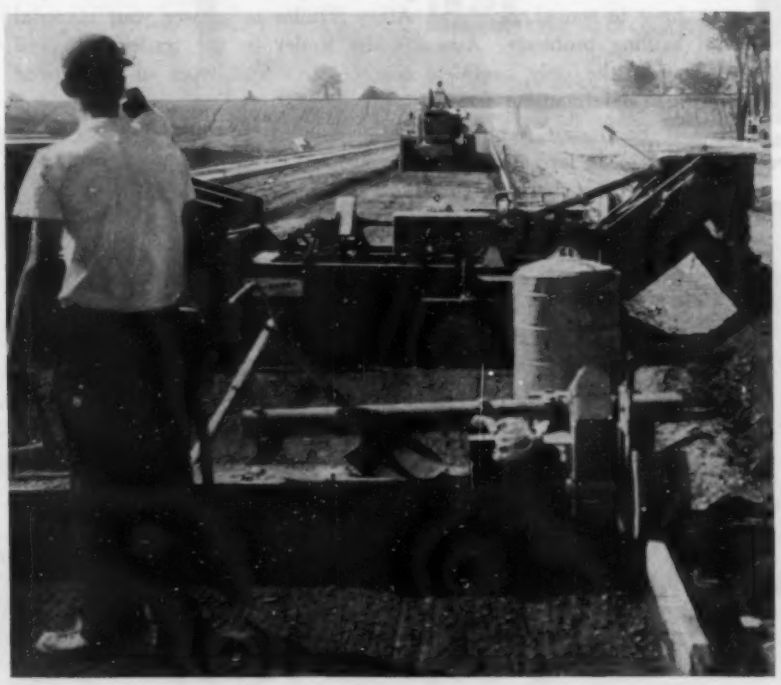
This Concrete Paving Job

1. Batch delivery was performed chiefly by trucks equipped with special high-speed hydraulic hoists. With these hoists the drivers could raise, dump and lower, all within 11 seconds. The hoists were designed and built to specifications worked out by J. A. Jones Construction Co. in collaboration with Hercules Steel Products Co. The quick-acting hoists, mounted on ten Ford F-750 Big Job trucks, were credited with cutting several seconds off the paver cycle; the job average achieved was 51 seconds between batch dumping for a 37.4 cu. ft. concrete batch mixed the prescribed 1¼ minutes. The dual-axle equipped trucks carried four batches, reducing the number of trucks and drivers necessary compared with delivery with 3-batch bodies.

Five additional Fords with 3-compartment bodies of other manufacture shuttled interchangeably with the special trucks. The two types of trucks were so routed as to maintain the desired delivery rate for the forward and rear paver, which placed 5 in. and 4 in. lifts respectively.



All-In-One Finisher **Two oscillating transverse screeds plus a third screed which substitutes for the bullfloat—another innovation which J. A. Jones Construction Co. was quick to try out with good success.**



Adjustable Subgrader

The mechanical subgrader, seen here towing a trailgrader, was of latest design embodying a quick-change crown, set by the operator without stopping the machine.

2. The equipment train behind the second paver included a new unit developed by Flexible Road Joint Machine Co. This unit comprises two transverse oscillating screeds and also a third screed at the rear of a long-wheelbase frame. Designed to combine the work of the familiar finisher and power bull float into a single mechanism, this machine worked to the satisfaction of the Jones staff and the engineers. Because of this machine's newness to the crew, the contractor put a conventional finisher immediately in front of it, in conformance with common practice of having two transverse finishing units behind the second paver.

(Continued on page 90)

The Athey PR20-Cat DW20. Capacity 22.5 cu. yd. speeds up to 32.1 MPH for high-speed hauling.

The Athey PR15-Cat DW15. Hauls 22 tons of rock or other material at speeds to 31.3 MPH.

The Athey PR21-Cat DW21. 34 ton capacity, maneuverable for crowded areas. Standard or heated body.

ATHEY OFFERS YOU

the only COMPLETE and PROVED Trailer Line

The new Athey Hydraulic Ejection Trailer. Handles sticky, hard-to-discharge materials, controls dumping, spreads load at dump.

The Athey PD20-Cat DW20. Dumps on the go, speeds long haul jobs, capacity 31 tons at speeds up to 25.1 MPH.

For tough rock and earth jobs...

Whether it's big rock — gumbo clay — ore, mud or earth you have to move, there's an Athey Trailer to answer your material hauling problems. Athey is the leader in the trailer field and offers the only *complete* line of sizes and types of high-speed material handling trailers.

Each unit is built to rigid standards of quality construction that mean long life and low upkeep. Proven Athey design features are setting the pace for faster dumping, greater maneuverability, easier loading and higher production.

Select the exact size and features to gear your job for highest output. Depend on quality-built Athey Trailers powered by Caterpillar Wheel-Type Tractors. Ask your Athey-Caterpillar Dealer for information on "the complete line" today, or write direct to us. Athey Products Corporation, 5631 West 65th Street, Chicago 38, Illinois.

THE *Complete* TRAILER LINE... *by the Leader*

Athey

. . . for more details circle 198, page 16

Close-up view of the Cat D9 push-loading a DW21 and scraper near Globe, Ariz. Twin Disc Torque Converter components are standard in the torque converter version of the powerful D9 and D8. Inset (left) shows Roy E. Hale, Superintendent, and Link L. Colvin, Co-owner of Copper State Construction Co.

"Torque converter gives the Cat D9 that extra 'boost' when you need it"

Roy E. Hale, Superintendent, Copper State Construction Co.

When Copper State Construction Co., Mesa, Ariz., took on the contract for building a clover-leaf on U. S. Highway 70 about 20 miles east of Globe, Ariz., it had to move some 70,000 cubic yards of earth—fast and profitably. So one of the powerful Cat D9's (equipped with Twin Disc Torque Converter components) was put on the job, push-loading Cat DW21's and scrapers.

Sizing up the D9's operations, Copper State's Superintendent Roy E. Hale commented: "This D9 is the machine we've been looking for. We like the torque converter drive. It makes the machine operate smoothly and will give it a lot longer life. And when we need that extra 'boost' for tough material, the torque converter gives it to us—with full engine power!"

Little wonder contractors are specifying so many Cat D9 and D8 Tractors with torque converter drive. The torque converter permits the engine to operate at all times in its most efficient speed range . . . it automatically matches output torque to load demands . . . and its fluid connection absorbs those jolts and shocks that cause excessive wear and parts breakage.

Contractors everywhere agree that crawler tractors equipped with torque converter drives mean just this: less maintenance, more production—and greater-than-ever profits! Specify a hydraulic torque converter drive in your next D8 or D9 crawler tractor . . . and don't overlook the advantages of Twin Disc Torque Converter drives in other types of industrial equipment or repowering jobs.

TWIN DISC

TWIN DISC

Torque Converters

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division) Rockford, Illinois

. . . for more details circle 253, page 16

ROLL UP PRODUCTION *with help like this . . .*

- **EXCLUSIVE "ROLL-AWAY" MOLDBOARD . . . moves tough dirt fast**
- **NEW TOGGLE-TYPE CONTROL . . . kick-free in the rough . . . pinpoint accuracy at the blue-tops**
- **HIGHEST AXLE AND THROAT CLEARANCE in its class . . . for better handling of biggest loads**
- **TOUGH TUBULAR FRAME . . . shock-absorbing strength down the middle**
- **BOX-SEAT COMFORT AND VISIBILITY . . . satisfied operators . . . more and better work done on all grading jobs**

ROLL-AWAY is an Allis-Chalmers trademark.

These are five of many reasons why Allis-Chalmers FORTY FIVE motor graders are showing up in more and more top construction organizations. They're precisely what you dirt-moving specialists ordered . . . ready now to help you handle the big road-building years ahead. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

. . . for more details circle 302, page 16

Streamlined Subbase Construction **Aggregate was placed by a mechanical base spreader, with excess stone to be removed in the final trim. Excess material removed from between forms following preliminary rolling, using a pair of 7-yd. scrapers. (Scrapers here assisted in loading by grader operator, who made final trim followed by final rolling.**

Innovations Stepped Up Paving Job

(Continued from page 85)

Numerous engineers and contractors who visited this job showed great interest in the unit and its possibility for doing a high-speed finishing operation with economy. (3300 lin. ft. of 25 ft. pavement per 9-hour day reported by Denton Construction Co., of Detroit, last season.)

Aggregate Tunnel

3. A third innovation was the use of a newly developed aggregate tunnel design at the batch plant, capable of delivery up to 520 tons per hour to the bins as part of a 450 tph over-all plant design. Designed and built by Triangle Engineering Co., this system is known as T.E.C. 500, "The Mighty Mole," when in operation looks at first glance like any ordinary steel pipe buried under the stockpiles and equipped with gates and a power belt. The difference lies in its sectional construction. The tunnel's 280 ft. length for this installation was made up of 6½-ft. diameter by 20-ft. long sections, each consisting of a segment of fabricated angle-reinforced steel-plate tunnel having the frame and rollers of the belt conveyor support built in as a welded integral part. Each section is fitted with cable plugs and sockets, so that wiring for tunnel lighting and the belt motor can be quickly connected or disconnected between the 20-ft. sections.

A flat base plate is also part of the cross-section design, as are lifting hooks. The sections are handled on and off of trailers by a crane. The en-

NOTES ON SPECIAL HIGH-SPEED BATCH BODIES

- Designed and built by the Hercules Steel Products Co. to ideas and specifications of J. A. Jones Construction Co.
- Mounted on Ford T-750 tandem chassis.
- Body dimensions 12' x 7' x 38", with Hercules Model 15 cement boxes, for handling 4 batches totaling 5,150 lb. per 37.4 cu. ft. batch including about 847 lb. of cement.

- Cycle data: 4 to 6 seconds dumping time, in order to supply a 2-batch paver working on a 75 second cycle, with total batch charging time of 37 seconds which includes raising and lowering skip and backing truck for next dump. (Six seconds considered maximum allowable time for dumping without delaying the mixing cycle).
- Front telescopic single-cylinder hoist, designed for high lifting capacity, with low oil pressure, for long equipment life. Heavy-duty oil pump designed for fast hoisting at low engine speed.
- Hoist design eliminates lifting arms, rollers, etc., for maintenance economy. Hoist's location is such that it never has to lift over 50% of the payload; remainder carried on body hinges.
- Hoist cylinder diameters 3, 4 and 5 in., designed so that progressively faster hoisting speed is attained during hoist period, with the maximum power applied in the initial lift for effective utilization of hydraulic power.
- Hoist motion braked with minimum stress on mechanism by means of an automatic bleeder valve. Relief valve is also included for positive protection against overloading hydraulic systems.
- With the body elevated to the maximum stroke of the hoist the bleeder valve offers a rapid rising and falling motion of 4 to 10 inches with a safe hydraulic cushion on both extremes, by simply actuating the chassis accelerator, which readily cleans the body without the necessity of frogging the chassis.

. . . for more details circle 302, page 16

● **Hydraulic form pin puller was one of the many labor-savers.**

tire 280 ft. tunnel reportedly could be unbolted, picked up, moved out and set up at new location within 24 hours.

Dozer and Trap Feeding

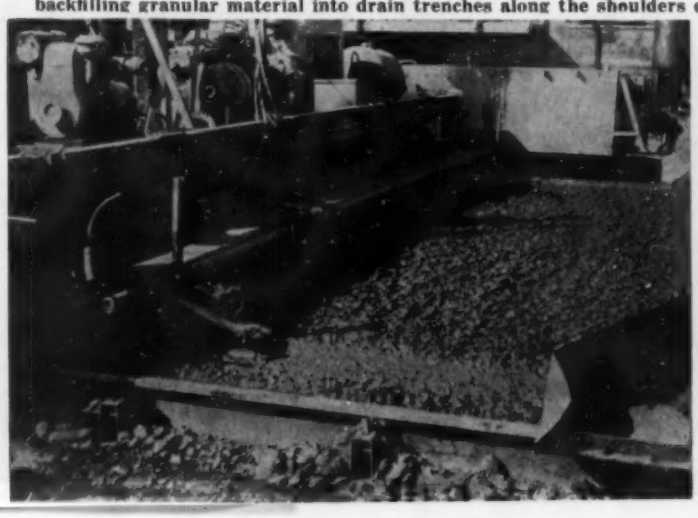
Dozer-and-trap feeding on this project eliminated two clamshell cranes and related work, at a reported saving of $11.50 per hour for direct labor. A single D7 or D8 dozer kept the three aggregates stacked over the gates, and also performed clean-up work around the plant.

Hydraulically controlled, electrically actuated gates at 10 ft. intervals along the tunnel (two built into each 20-ft. unit) were handled by means of a master control panel located in the tower. The operator at this location could maintain a visual check on the three bin compartments. By means of control levers he kept an even flow of any desired aggregate on the tunnel belt and 200 ft. delivery belt. Turn head distributor chutes, also electrically controlled, fed the individual bins. By means of a special regulator, air-ram-operated gates could

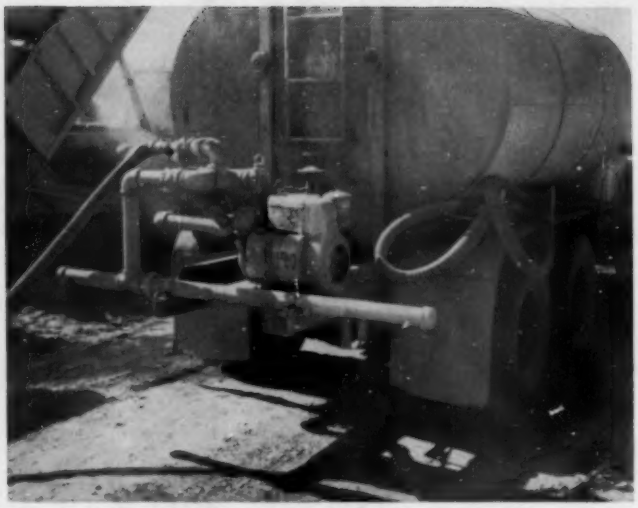
Remote Control of Delivery **Automatically controlled gates, operated from the tower, kept the belt supplied with whatever aggregate was needed for bin supply.**

Sectional Tunnel **Another view of the tunnel, showing 20-ft. units in place ready for building the stockpiles over the gates.**

● **(Left): Maginniss vibrators were attached to rear of top-lift-spreader. (Right): Blaw-Knox widening spreader used for backfilling granular material into drain trenches along the shoulders or ditch lines.**



● Project manager W. H. Lashlee seen using one of seven Motorola radiotelephone units which helped expedite the job for J. A. Jones Construction Co.



● High-speed Rex 4-in. pump with Wisconsin motor, mounted on the paver supply tanker.

● When will the steel arrive? In common with hundreds of other highway contractors, the Jones organization had to plan on delayed deliveries. Note paved under-slope, one of the design features of this overpass structure.

be closed quickly or slowly, as desired, for accuracy of delivery volume and cut-off from any combination of gates.

Another feature designed for J. A. Jones was an air-operated take-up by means of which slack in the delivery belt could be controlled—a feature contributing to accuracy of bin delivery and greater belt durability.

A 150-ton, 3-compartment bin and 1,800-bbl. cement dock, both automatically controlled Blaw-Knox units, completed this plant, which was powered by a Caterpillar 326 diesel generator set.

4. The Buckeye subgrader used on this job constituted another piece of major equipment news. This machine was suggested and the design approved by J. A. Jones and the first one manufactured specifically for J. A. Jones. The new feature of this familiar unit is a quick-change crown, controlled single-handed by the operator while machine is in operation.

● A note on preliminary base and paving operations. The specified shoulder-to-shoulder granular subbase material was placed in a 9-in. loose lift using a Blaw-Knox base spreader. This lift was rolled to 6¾ in. compacted depth, leaving ¾ in. depth for trimming and final rolling. Tight blading down was done with a Cat 12 grader, and excess material taken out by one LeTourneau-Westinghouse D Tournapulls.

Setting Forms

Forms from General Road Machines, Inc., were set with aid of a Cleveland form grader and form tamper, with Le Roi 105 Tractair air supply for bin driving.

Then followed the Buckeye subgrader towing a Cleveland trailgrader; a Buffalo-Springfield tandem roller, a scratch template, and the subgrade was ready.

Project Manager

W. H. Lashlee has served as project manager, Jerry Ray, project engineer, and Orland Oren, properties and equipment manager, for J. A. Jones Construction Co., working under J. P. Cockrell, manager of Ohio operations for the company's highway division. W. M. Pfleiderer is resident engineer for the Ohio department of highways under the department's division 3 at Ashland.

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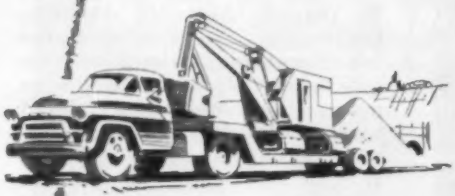

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. . . for more details circle 264, page 16

"LET'S GET ROLLING"

(Continued from page 80)

light emergency vehicles, for traffic management and accident handling.

The standards of maintenance to be established for urban Interstate segments, which will include 55% of this system's cost, came up for discussion by the fourth panelman, Maj. Gen. Louis W. Prentiss (ret.), executive-vice president, American Road Builders' Association. Interstate System construction cost will be borne largely by federal funds, he noted, but who will finance and direct maintenance and traffic control within cities? Inadequate maintenance is unthinkable for such important highways, he warned, yet at present there is no assurance of uniform maintenance and traffic management on this system.

The problem is not only to preserve the physical investment, said Gen. Prentiss, but also to insure against loss of capacity, such as comes even with the best advance planning when repairs must be made under traffic. A nationwide standard should be adopted for such items as portable flashers at repair sites, signing to direct traffic through repair operations, etc. These procedures now vary greatly from state to state and city, not only in character but in degree of sufficiency.

• General state highway maintenance developments in New Jersey were outlined by John W. Evans, maintenance engineer. This included:

1. Private weather reporting service was inaugurated in 1956. The department likes it and will continue the service, as an aid to anticipating snow and ice conditions.

2. Straight salt instead of salted abrasives was adopted during the past year. The policy is still on trial.

3. Mudjacking kept five machines going last year, and two new machines will be added in 1957.

4. Shadow patching, or application of thin concrete patches on work areas of concrete, has been used with success, employing a Bondactor machine.

5. The heavily traveled Pulaski Skyway approaching Holland Tunnel was resurfaced to correct a wavy surface condition, using a one-half-inch tack-

(Continued on page 96)

Next Month: Look for Review of Road Show Equipment Displays and Technical Sessions

Pyke Johnson Receives Bartlett Award

Pyke Johnson, "America's Apostle of Good Roads" and former president (retired) of the Automotive Safety Foundation, was awarded the George H. Bartlett Award at the AASHO meeting. G. Donald Kennedy made the presentation as a past-president of AASHO and former recipient of the award. The award, presented each year alternately at the AASHO and the Highway Research Board annual meeting, was founded by friends of Bartlett, who was a pioneer good roads figure, and is given for distinguished service in the cause of highways.

Pyke Johnson

"LET'S GET ROLLING"

(Continued from page 94)

coated carpet of hot plant mix. A previous attempt to surface-treat the deck at night didn't work out well. The plant mix was feathered at deck joints, and possible raveling at these points under snow plows or traffic is considered a possibility. (In discussion, a Massachusetts delegate said that ½-in. plant mix hasn't stood up in his state.)

6. Possibly the most important maintenance development in New Jersey, and one of wide design interest, was the recent decision to stabilize all existing arterial road shoulders. The work was begun in 1956, as a means of adding safety and stemming maintenance costs. (On busy roads the patrolmen heretofore have been kept busy "stropping the razor," i.e., running the blade back and forth to keep the gravel shaped.) Over 1,200 miles of shoulder stabilization is planned. Both bituminous and soil-cement methods will be employed; soils data are being gathered to aid in selecting the best method. All new arterial projects will include stabilized shoulders.

7. Channelization is an important task, now progressing as funds permit. The job has been handled heretofore by maintenance crews, who often make improvements "by eye." Over $2 million per year is involved, and consideration is being given to setting up a special state-wide engineering party to design, layout and supervise intersection improvements.

8. Bridge painting is a growing cost item as grade separations increase in number and get older. Special maintenance crews are handling this work and doing other bridge maintenance.

9. An outside-edge white stripe is being added progressively on all state routes.

10. A state-wide campaign against illegal encroachments requires constant attention. Many people feel they have a right to put up signs or obstructions on the right-of-way, said Mr. Evans. The state attorney general is cooperating.

11. Contract maintenance in New Jersey recently included a try at contract line-striping. About 25 miles of such work was awarded to supplement the state crews. Weed control was also recently contracted as a trial.

12. Radio telephone for maintenance and administrative control was installed by the department in 1956, with 175 mobile units and one base station serving the entire state. "Don't see how we got along without it," was Evans' comment.

13. The state has set up a training program for maintenace Engineers. "Few civil engineers want to go into maintenance," said Evans in discussing serious personnel shortage. The program represents a try at developing more interest in highway maintenance as a career for graduate engineers.

● Another session speaker, while not on the expressway panel, chose this type of facility for much of his comment. H. E. Diers, maintenance engineer, Illinois, said that the Illinois department staff would welcome any exchange of experience with toll road operators. He gave recognition to the need for special organization to maintain heavy-traffic facilities. Designers, road maintenance and traffic engineers should all give special attention to such varied matters as the best location of maintenance yards and depots, median cross-over points for maintenance and police personnel, roadside and median upkeep, right-of-way fencing, trash collection, frontage roads, proper signing (especially at ramps where much confusion still is shown), erosion protection at ramps, etc.

The wide right-of-way required for expressways will entail a high per-mile maintenance cost (often 70 to 80% higher than for two-lane roads, noted Diers), and greater mechanization of maintenance will be required. Also, Diers urged closer cooperation by planners and designers, to insure that maintenance can be "built out" of the new roads whenever possible by intelligent slope design, proper location of shrubbery, and other means.

A discussion of the litter problem took place in this maintenance session. A visitor spoke briefly in behalf of a civic beautification group. Several state delegates told of unsatisfactory results in trying to get motorists to cooperate. In Florida, trash cans placed at rest stops which happen to be near urban areas, have been used for garbage disposal. One engineer cut the discussion short by asking whether there aren't more important maintenance tasks, dollarwise, that should have first attention. Nevertheless, trash collection has cost increasing sums, and several delegates agreed that beer cans tossed from autos constitute the chief culprit.

● *Traffic Engineering Developments.* A high spot technically at the Atlantic City AASHO convention was the attention given to traffic engineering in its varied and growing aspects. Two sessions were held by the Committee on Traffic, of which M. L. Shadburn, state highway engineer of Georgia, is chairman and C. W. Prisk of the Bureau is secretary. One session was devoted, among other topics, to correlation of geometric design and directional signing, and to practical applications of radar and other electronic aids to traffic control. The other session covered intersection design principles, and a panel of papers on signing of the Interstate System. In addition, traffic problems were represented in the maintenance and other committee meetings, reflecting the growing awareness of the all-pervading importance of traffic control and operation as an element in highway planning, design, construction, and mantenance.

The need for correlation of geometrics with traffic requirements was reviewed by Marshall W. Rich of Wilbur Smith & Associates (whose remarks actually constituted a paper

(Continued on page 108)

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- **MOVES FULL LOADS AT FULL SPEED**
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This is the Allis-Chalmers TS-360 . . . a motor scraper that has proved it can help you handle big, tough jobs on rubber . . . profitably. As bidding gets tougher, be ready with the best . . . TS-360's. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS *Engineering in Action*

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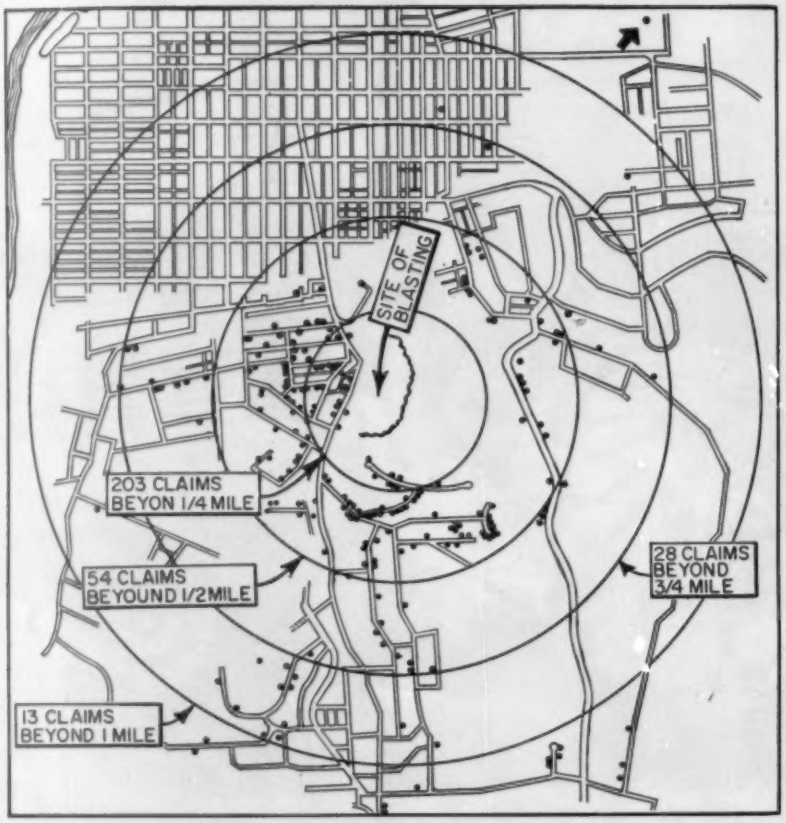


● **Blast damage location claims were scattered all over this city, following a shot that couldn't possibly have caused damage. Dots show claim locations.**

Boom! Went Blast, And How the Damage Claims Rolled In

THE accompanying map sketch of an area covering Newport, Kentucky, was inadvertently omitted from the article "Defense of Blast Damage Claims" by Stratton O. Hammon, as published beginning on page 84 of Roads and Streets for November.

This drawing is reproduced herewith, as being of special interest to contractors in and around urban areas who have rock blasting to do for highway improvements. Mr. Hammon who is president of Vibration Damage Specialists, Louisville, Kentucky, comments on this map as follows:

"In spite of extreme care, a contractor, blasting in limestone and shale at Newport, Kentucky, to clear a site for a supermarket was deluged with newspaper publicity, injunction suits, and 241 claims for damage. Note that 54 of these were beyond a half mile radius and 13 beyond one mile.

"The density of population was rather similar around the site of operations, but the concentrations of claims followed valleys which led the sound of the explosions in certain directions. Neighborhood gossip accounted for smaller concentrations.

"The contractor moved from this project, where the closest structure was 800 ft. distant, to another job in Knoxville, Tenn., where the distance to the closest building is 17 ft. Moreover the second blasting project was of a progressive nature moving several miles through the heart of the city. Nevertheless, there have been no claims at Knoxville. The difference in the claim situation, we believe, is directly attributable to the fact that no pre-survey was made in Newport and a very thorough one, complete with photographs, was made in Knoxville."

Court Decisions

Duty in widening street

In widening Delmar Boulevard in St. Louis, Missouri, a terrace fronting on the street was cut away by the contractor and the space bridged with planks for access to the street from the apartment buildings fronting on the boulevard.

A woman weighing 260 pounds, employed as a servant in one of the apartments, was injured when one of these planks broke throwing her into the ditch.

Judgment against the contractor for these injuries was sustained by the Missouri appellate court with the comment, "The contractor was under a legal duty to exercise ordinary care with regard to the rights of the tenants of the apartment building, their employees and guests. In this situation we cannot say that the contractor was absolved of any duty to persons lawfully using the roadway, to exercise ordinary care to provide a temporary bridge."

Joshmer v. Fred Weber Contractors, 294 S.W.2d 576

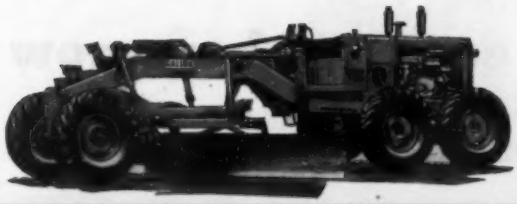
Tree removal question

Suit by road contractors against the New York State Thrughway Authority for extra work in tree removal, was decided by the Court of Claims of that state in favor of the contractor. Specifications prepared by the state stated that the present grade elevations shown "are as they existed before clearing was done" and that the facts were given for the convenience of the contractor to aid him in arriving at the quantity of excavations, grading and backfilling.

In allowing the claim of the contractor for the removal of trees the court held the contractor's obligation to perform this contract did not come into existence until the elevation of the grade had been brought to the grade shown in the drawing as the existing grade or level.

"It would seem," said the court, "that the removal of the trees was not contemplated by the provisions of the basic contract and that the Authority breached its basic or main contract when it compelled the claimant over the latter's protest, to do the work as a contract item."

Harnett Co. v. New York State Thruway Authority, 155 N.Y.S.2d 100, August 2,1956



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GRADE-O-MATIC Drive utilizes a torque converter with tail shaft governor and power-shift transmission, in combination with correct balance of grader weight and power to produce most "push-power" at the blade. No foot clutch or gear shift lever. Automatic features simplify operation and provide top-most performance.

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Model T-700 . . . . . 190 h.p., 40,125 lbs.
Model T-600 . . . . . 140 h.p., 30,420 lbs.
Model T-500 . . . . . 125 h.p., 25,765 lbs.

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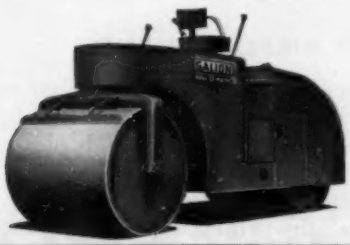

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ALLIS-CHALMERS *Engineering in Action*

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As shown above, the 293Q-Sr. can be easily converted to a 293QS TwinDual Gravel King by replacing the apron feeder with a scalping screen and swivel feed conveyor.

"Our Universal 293Q-Sr. portable crusher

Saves us $2400 a day in trucking costs alone"

says Mr. Ken Smith, Vice President, Princeville Stone Company, Princeville, Illinois

"We invested in the Universal 293Q-Sr. because it was the only single unit portable plant that could give us 'big stationary plant' crushing capacity. Its outstanding production record has meant more truck loads of finished material. This, combined with the plant's portability, accounts for the savings of $2400 per day in trucking costs alone. In addition, we have stepped up our jobs 25%.

"The production speed of our Universal 293Q-Sr. astounds most of the contractors in this area. They call the crusher 'hot'. It's no wonder, when you consider the size of the basic units in this plant — a 20" x 36" jaw crusher, a 30" TwinDual roll crusher and a 4' x 12' (2-5/6 deck) screen. The jaw and TwinDual rolls combine to give us three stages of rock reduction. Actually, the plant produces capacities expected of stationary plants — yet skid mounting of apron feeder and jaw crusher makes moving fast, easy and within highway weight limitations.

"Also, the Universal 293Q-Sr. is versatile. We can quickly make screening and crushing adjustments on the spot to meet state specifications. Yes, our 293Q-Sr. represents a gilt-edged investment to us", states Mr. Walter Smith, President, Princeville Stone Company, "It will bring us dividends over the next 15 years."

These are but a few of the important reasons why you should consider a Universal 293Q-Sr. portable crusher . . . your opportunity for additional profits on new highway program jobs. The 293Q Twin-Dual Pacemaker is made in three sizes (293Q-Jr., 293Q-Sr., 293Q-Super Sr.) to meet various production requirements. Write for complete information today!

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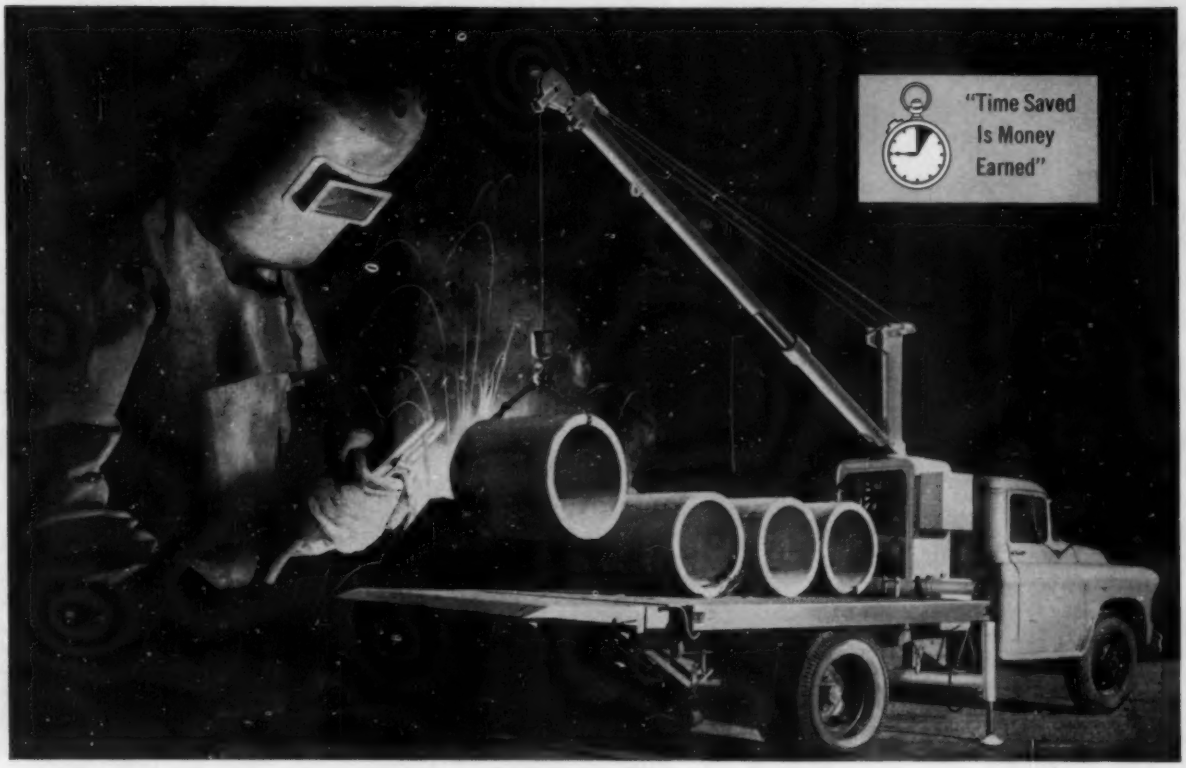

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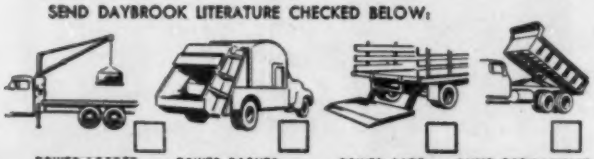

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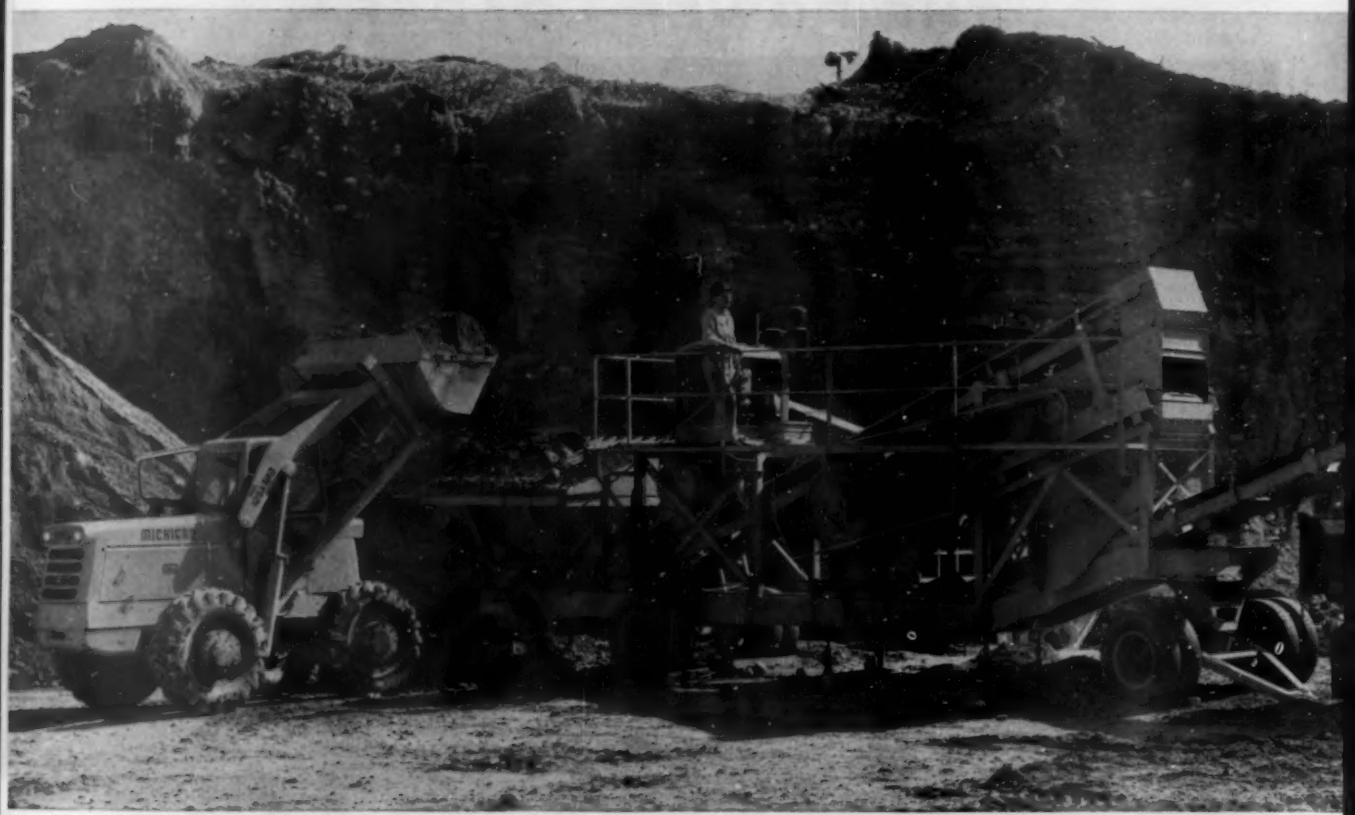
SOME UNUSUAL WAYS

Michigan Tractor Shovels are saving time and money for paving contractors around the country



Feeds portable crusher—Making good use of its high lift, Michigan Model 125A digs and dumps raw bank gravel into hopper of 100-ton-per-hour base material plant. Photo comes from Southern Hills Inc. pit near Dayton, Ohio, where the 2 yd Michigan did the work of a more expensive, less versatile, far less mobile excavator-crane.

Grades shoulders—Special side bucket attached to Michigan 175A grades 3 ft shoulder next to newly-poured slab. Unique rig does jobs not possible with grader drop-blade . . . including filling holes, distributing gravel, removing spoil. Attachment, designed by Villa Contracting Co, is helping widen 27 mi of N.J. Garden State Parkway.

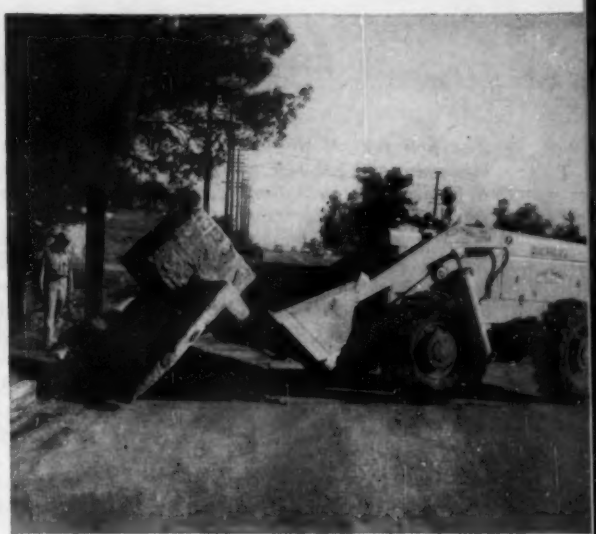
Pours concrete—Hauling concrete in Michigan Tractor Shovel bucket, Slattery Rock Corp. solves problem of laying 6 lanes of New York's Deegan Expressway under low viaduct. Two of these maneuverable "buggies" needed only 4 hours, 200 to 250 trips to pour 800 ft of each 12 ft lane.

Carries pipe—One of Peter Kiewit's Michigans serves as all-around handyman on company's Indiana Turnpike contract. This 95 hp model lifts up to 11,000 lbs, carries 5,500 lbs at 4 mph. Note excellent all-around visibility given operator.

Breaks, loads asphalt—Before resurfacing street in Worcester, Mass., Contractor Charles. Chaffee uses 1¼ yd Michigan to strip old asphalt. No "ramming" is required—powerful breakout quickly shatters paving.

Cleans pavement—Highway must stay open said Nashville officials, so Wright & Lopez do cleanup with small, agile 16 cu ft Michigan. Only 4'2" wide, 10'8" long, unit works rapidly, doesn't block traffic, doesn't damage newly-set pavement.

. . . for more details circle 210, page 16



Removes sewer cover — When other big loaders failed, Kirby-Erwood's 133 hp Michigan succeeded in prying off this 2-ton concrete cover. Assignment was part of cleanup before widening Los Angeles freeway.

Digs shot rock—Time studies proved to Nelson Bros., Reading, Kansas, that this 2¾ yard Michigan would outproduce crawler-loaders in both pit-run and shot rock.

Breaks, loads concrete—On Philadelphia city street repaving job, Union Paving Co. breaks and loads 4 to 6-inch concrete slab with this 2 yard Michigan Model 125A.

Highway Estimating Methods

By Geo. E. Deatherage, PE
Construction Consultant

Mr. Deatherage, author of this series on highway cost-keeping, has developed an 8-volume "Manual of Advanced Construction Management" for readers who are interested in more details of cost-keeping and the many related subjects in highway contracting business management. Please address your inquiry to George E. Deatherage and Son, P. O. Box 921, Lake Worth, Florida. Many contractors are finding this manual useful in a training course for superintendents and project managers. It is written primarily for these supervisory employees as an aid in better equipping them for taking on larger responsibilities and improving their management techniques.

V Application of Industrial Engineering Techniques

The first part of this article, ending mid-point on page 119, was published in Roads and Streets, December, 1956, issue, with the identifying headline omitted by the printer. This portion is herewith repeated, together with the related second section on Gang Process Charts.

Simple Process Charts

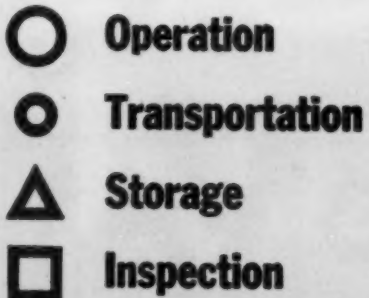
It hardly seems necessary to point out that, before an estimator can figure a unit price or cost, he must first determine the method to be used in performing the work. What men and machines, separately or in combination, are to be used, and what estimated production is to be secured by their use? It follows necessarily that there are several alternate possibilities. The problem is to select the one best method out of several.

Currently and traditionally in the construction business, the practice is that the estimator forms a mental picture of what is to be done and, using his best judgement, with or without the advice of others, determines the method which (in his opinion) is best for that purpose. It is to be emphasized that this is, in the main, purely a mental process of method selection, rarely put down on paper and subjected to a detailed analysis as compared to other alternates.

This type of work methods selection may be termed purely "snap judgement", and may be in error, either in part or as a whole. It is not subject to detailed mathematical analysis to prove or disprove it correctness. This has a good deal to do with the fact that since 1945, contractor failures have been continuously on the increase and the average age of firms in the construction business is not much over 3 years old and that at least 40% of new construction firms fail to survive 2 years.

The above amazing figures for the industry as a whole certainly points to the fact that, in order to correct this condition, there is need for a radical change. The first thing needed is the elimination as far as possible, of "guess work" in estimating. The construction industry must remove itself from the pinnacle of exceptionalism which it has consistently maintained, as to the adoption of the industrial engineering techniques, the backbone of the manufacturing and process industries.

Fortunately, over the years, the industrial engineering profession has developed very simple but scientifically accurate methods of locating unerringly, and evaluating exactly, what is wrong with any production process, and also methods of pre-determining the one best method. To substitute for the nebulous mental image of what is to be done, and how to do it best . . . a picture or image is created on paper which can be subjected to detailed mathematical check and analysis. Guess work for all practical results is eliminated or at least reduced to a minimum.



PROCESS CHART uses a sign language made up of 4 simple symbols.

• Symbols which will simplify the work of describing process steps.

• It will be the purpose of this article, and several to follow, to introduce the estimator to the technique of "Work Process Charts" as a means of "methods pre-planning." This technique is in use in but a handful of contracting organizations, but is gradually spreading. We will start with the most simple type of "Process Chart" and progress in future articles in this series to "Process Gang Charts," "Gang and Material Charts," etc., which, although sounding complex, are in reality very simple.

It is well to keep in mind that on construction work fully 85% of all labor is expended in transporting materials and but 15% or less in frabicating or changing their shape.

Referring to Fig. 1, it is to be noted that the chart is built up around a simple type of shorthand which is used to identify the nature and extent of what is being done, or planned to be done, on each step of the specific work in hand.

The large circle indicates the "operations" in the process of performing the work, such as piling lumber, sawing lumber etc. If the operation changes the shape of the material to be used on permanent construction, such as "sawing lumber", the circle may be filled in solid. Piling lumber does not so change it, so it is left open.

(Continued on page 118)

100% anti-friction drive

gives you bonus push-power... top efficiency

Adams 660 grades sub-base on reconstruction of State Highway 140, near Foxboro, Mass. Contractor is Rufo Construction Co., Boston. John M. Rufo, Vice President, has this to say about the work-ability of his company's "660": "When slow, steady blading is needed, the Adams works slow without sacrifice of power. When fast secondary passes are made,, no other machine can touch its speed. It definitely has greater pushing ability... practically eliminates the need for a bulldozer on a road graveling job."

Compared to other graders, Adams heavy-duty machines deliver a greater proportion of developed engine-power to tandem wheels. An Adams gives you this bonus work-power because all gears and shafts in transmission, final drive, and tandems turn on anti-friction bearings.

Push bigger loads . . . faster

Because the Adams' drive has roller- and ball-bearings throughout, very little of its horsepower is lost thru friction. More thrust is made available for pushing bigger loads . . . for blading deeper . . . for working faster. Furthermore, with an anti-friction drive, your graders' fuel-cost per unit of work done is correspondingly lower. Finally, longer bearing life cuts maintenance expense and downtime for repairs.

Transmission delivers maximum torque

The Adams transmission provides more power-speed combinations than other graders . . . 15 speeds . . . so you can do every grading operation at fastest practical rate. At each speed, transmission delivers maximum torque, because all gears and shafts turn on anti-friction bearings. It is fully constant-mesh . . . gears always engaged for fast, easy gear-shifts without clashing. Crown-shaved helical gears mate precisely . . . run continuously in oil . . . do not "howl" . . . give extra-long life.

Rear-Axle carries no weight

In heavy-duty Adams graders, 80 to 190 hp, the main rear axles are full-floating — they do *not* carry weight of the grader. Instead, rear-end weight is borne by sturdy axle carriers, consisting of two concentric, tubular-shaped, steel housings — one inside the other. Tandems oscillate at will on the two axle carriers. Grader keeps all four tandem wheels on the ground, even in roughest terrain . . . driving, pushing, working all-the-time.

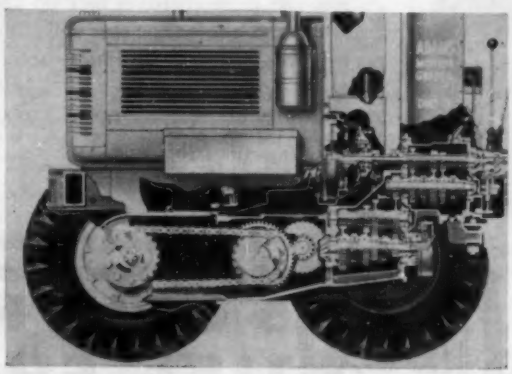
Inside the axle-carriers, driving-axles float "free", mounted in anti-friction bearings. They are fully protected from abnormal shocks and stresses of rough terrain . . . secure against breakage and undue wear.

Ask for demonstration

See how Adams' 15* speeds, with power delivered thru 100% anti-friction drive, give these machines *bonus* push-power . . . a capacity for work no other grader can match. Let us explain how an Adams saves you money on fuel and repairs . . . how it can keep producing for you week-in and week-out. 6 models, 60 to 190 hp. Choice of General Motors or Cummins diesel engines on 5 larger models. Call or write for all the facts.

**190 hp* POWER-*Flow 660 provides infinite number of power-speed combinations (to 27.4 mph) thru torque converter. 60 hp Model 220 has 9 speeds forward, with optional creeper gears . . . best in its class.*

Adams, POWER-Flow—Trademark AG-1231-H-b



All gears and shafts in the Adams transmission turn on ball-, needle-, roller-, and tapered-roller-bearings.

Main rear axles are mounted on anti-friction bearings, and carry no grader weight. Instead, rear-end weight is supported on concentric, tubular axle carriers. Inner axle carriers are bolted to tandems; outer carriers to final drive housing. Thus, tandems can oscillate freely — without putting stress on main axles. 100% anti-friction drive increases available work-power, reduces operating costs.

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 269, page 16

WHERE QUALITY IS A HABIT

"LET'S GET ROLLING"

(Continued from page 96)

prepared by George Webb of California, unable to be present). This analysis noted that as many as six or seven roadways may empty into an expressway interchange area. In interchange design there is much to be learned about the relationship of signing to geometrics, the affect of weather, and other factors.

The accumulative effect of a sign series is one of the phases needing study, there being many situations today where a single sign is not sufficient to impress directional facts on the driver traveling at high speed. Directional signing is the critical problem today everywhere on expressways.

This paper, which was restricted to fundamental considerations, pointed out that speed as a design element affects sign legend design, more than it does sign location. Speed determines the message size for any desired dwelling time, and the target value must be great enough to insure an ample dwelling interval.

The increasing lateral dimensions of the highway, including the wide shoulders, require a wide sign offset and represent another basic factor in sign planning. When three lanes are involved in one direction, signs in the median are often desired to supplement outside edge or overhead signs. The weaving distance utilized by motorists in thronging along multi-laned facilities is another reckoning factor, important in locating exit signs so as to give the motorist time to converge into the proper lane.

New study is also needed of the effect of such things as luminaires and poles, which may distract drivers even in the daytime. Where lighting is present, there is a best location for unlighted signs in conjunction, often outside the area of brightest illumination.

Signing is particularly a matter of concern today on expressways having frequently spaced exit locations. Spacing, frequency, and size at directional signs here must be worked out with great care.

Coming back to interchanges, this paper noted that the ultimate test of a good interchange design is the ability to sign it effectively. The driver must be able quickly to make a complex decision on route choice. The author ended by posing the question of how signing and geometric design effort may best be integrated within the highway agency. Cooperation must begin early. Signing cannot solve all the ills of poor design, and designers should be given the signing criteria at the outset. In considering interchange designs, the designer should favor the one easiest to sign. Ramps should be designed so that the motorist can see them. Too frequent exits should be avoided.

Overhead supported signs, including necessary electrical work, can be incorporated in the original design more economically than they can be tacked in later.

As a last warning note, the paper observed that it is seldom possible any longer to send a maintenance crew out to correct improper signing. The trouble usually goes deeper, involving geometric design which cannot be changed that easily.

A committee action report on traffic administration, presented by J. C. McMonagle, Michigan State College, brought out the great variation in the handling of traffic engineering functions within the respective state highway departments. In a pilot study covering five states, data were compiled covering 230 activities in 18 major categories, and an effort made to determine the extent to which the traffic functions were being carried out by the state highway department.

Complete 17-mile highway in 120 working days

Big "B", push-loaded by 190 hp crawler-tractor, gets heaped (18 to 20-yard) loads of sandy clay in 35 seconds. Rig made 1325′ round trip in about 3 minutes. On one portion of the contract involving 30,000 yards, haul and return distance averaged 5,000′ one way.

State Highway 4, between Fairfax and Sleepy Eye, Minnesota, needed rebuilding to make it safe for increased traffic. On this 17-mile project, the Minnesota Highway Department awarded a contract to Berghuis Construction Company, Prinsburg, to raise the road-grade, widen shoulders, and dig drainage ditches on each side of the road.

Contract called for moving 465,000 cu. yds. of sandy clay in 120 work days, so Berghuis leaned heavily upon his fast-moving, rubber-tired machines to speed production. The fleet he used for this project included two BIG, 293 hp B Tournapulls, three 208 hp C Tournapulls, one 208 hp Tournatractor, three 19-yard BT scrapers, four sheepsfoot rollers, two graders (one Adams 550) and four crawler-tractors. The 10 rubber-tired LeTourneau-Westinghouse earthmoving units handled 100% of the production dirt... kept the job rolling on schedule.

The three nineteen-yard BT scrapers, pulled by crawler-tractors, worked ahead cleaning drainage ditches and cutting down shoulders. Following these crawler-scraper teams, the two 28 mph "B's" and the three 30 mph "C's", push-loaded by 190 hp crawler-tractors, hauled fill from each side of the highway to raise the roadbed and widen shoulders.

"B's" average 18 to 20 yards per load

Since the B Tournapull is a comparatively new machine, you will be interested to know about its performance on this job. Push-loaded by a 190 hp crawler-tractor, each "B" loaded 18 to 20 yards in about a 75′ load distance in 35 seconds, averaged 17 loads per 55-minute hour. Coming out of the loading area, machines traveled in 3rd or 4th gear up a 5% grade for 30′ of the average 600′ haul. Rigs made 50′ spread in a little over 18 seconds. Complete 1325′ cycle averaged 3 minutes.

Likes Tournatractor, too!

Contractor Delwin J. Berghuis, pleased with his Tournapulls, had this to say about his 208 hp C Tournatractor which he used for push-loading, dozing and clean-up assignments: "I am very pleased with the C Tournatractor, and wouldn't be without it. When Tournatractor is used as a pusher for C Tournapulls, it loads the 'C's' faster than the 190 hp crawler-tractors, and has more maneuverability." Operator Edward Dykstra added, "I like its

Fast, 17 mph Tournatractor handled scattered dozing assignments in addition to push-loading.

quick, easy-shift transmission. It is fast and very maneuverable in tight quarters. Tournatractor is much quieter to operate than a crawler."

Cut service time

You'll also find that, compared to a crawler-scraper combination, the rubber-tired Tournapulls and Tournatractors take about half the service time to maintain and lubricate.

Look into rubber-tired power

For good production at lowest-net-cost-per-yard on your dirtmoving jobs, investigate these modern, electric-control, rubber-tired machines. Whatever your job, big or small, there's a LeTourneau-Westinghouse unit available to give you *more* work for your earthmoving dollar. Call or write for facts and figures applicable to *your* particular work.

Tournapull, Tournatractor—Trademark Reg. U.S. Pat. Off. G-945-H-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 270, page 16

WHERE QUALITY IS A HABIT

SALT STABILIZATION

(Continued from page 76)

it was demonstrated, results in difficulty in properly mixing.

The renovation work embodying salt stabilization has cost an average of about $3,500 per mile, with some sections running as high as $5,000. The chief cost variable has been the new aggregate, which in all cases was purchased from commercial sources within hauling distance. The state has furnished the salt for all jobs. Lack of sufficient fines to capitalize salt effectively has been a problem with some local aggregates.

The result as expressed by one Ohio engineer, has been to accomplish in six weeks, from award to completion, a secondary road modernization that would have required much more time and money by other methods considered.

The salt stablization has produced a tightly consolidated and stable roadbed in a few weeks, such as would ordinarily take years of traffic without this stabilizing agent.

• *In Conclusion.* This method of setting up this work on a simplified purchase-order type of contract basis is reminiscent of a similar program which proved highly successful in Ohio in 1951. As described in Roads and Streets, July, 1951, the unprecedented spring break-up damage on bituminous arterial road surfaces was corrected by making an emergency survey of the worst sections, and setting up simplified contracts, early-season, short-duration jobs appealed to contractors. As with the 1951 program, the contractors of the state responded with plenty of competition and bids favorable to the state, and gave Ohio road users an example of quick results in the public interest.

Comments on the new-in-Ohio method of stabilizing low-cost roads with salt were received by the Editor from several division offices of the Ohio department. L. B. Roth, maintenance engineer in the Marietta division, wrote as follows on his experience:

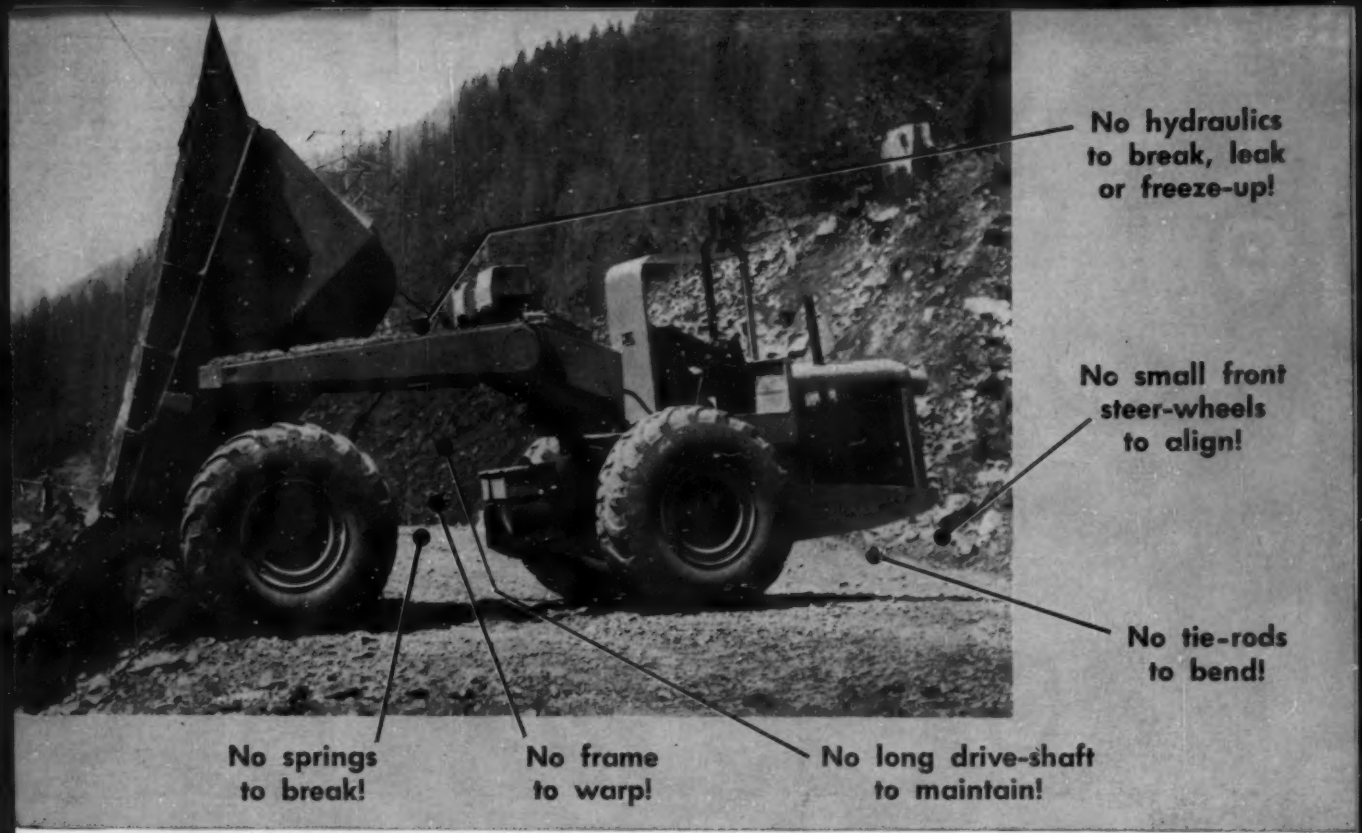
1. Lac of sufficient fines was definitely a problem. It was our thought initially that fines could be procured by pulling in from the berms or scarifying from subbase. It just didn't work out that way. For one reason the berms were exceptionally narrow and shale or rock was encountered on many of the grades.

Crusher run aggregate, 1½" or 1¼" top size, is suggested for future work, instead of graded new aggregate unless conditions dictate otherwise.

2. Compaction was not entirely satisfactory. We did similar work by force account and practically all our rolling was with loaded trucks. The results were excellent. Perhaps more passes of the rolling equipment would have done the job. Also, basing our conclusions on previous force account stabilization (no chemicals), a tamping roller gave excellent results.

3. Final shaping and rolling could be improved on. We suggest that final rolling with flat wheel roller be preceded by light application of water and very light shaping with motor grader.

4. Amount of water set up in contract not always sufficient. This did not hamper operations materially, however, since our purchase order contracts were in broad form, the required materials being used and the overrun handled by change order. In arriving at amount of water we used the formula (cubic yards of aggregate plus cubic yards of scarified material) x 5 = gallons. We believe a constant of 7.5 or 8 should be used.



Cuts your hauling costs!

Tournapull Rear-Dump overcomes most maintenance problems of conventional haulers

Construction of Tournapull Rear-Dump is radically different (and much simpler) than that of a conventional heavy-duty hauler. In place of a foundation frame and body sub-frame, Tournapull Rear-Dump hitches rear and front wheels through a horizontal yoke extending back from the kingpin, and pivoted to body itself just above and ahead of rear wheels. Body is simpler, much stronger... has no frame and sub-frame to get out of line.

Look at the photo above . . . note the absence of springs, spring hangers, and tie-rods. Low-pressure tires adequately absorb the shocks of rough haul-road travel and shovel loading. Eliminated are spring maintenance, replacement time, and cost of spring parts.

Front-wheel drive and kingpin-type power steer helps simplify Tournapull construction, too. No longer must power be carried back to the rear through a drive-shaft. Bearing and lubricating problems of a long drive-shaft are eliminated. No longer is steering handled by small front wheels subject to "bulldozing" and misalignment. There are no tie rods, no hinged steering connections to become twisted or bent.

Nor do you have the troubles of hydraulic hoists or gravity dumping with these Rear-Dumps. Dump is by an electric winch, that lifts the body up on twin cables. Operation is under complete control at all times — with positive power for dump and return controlled by an electric switch on the dash. There are no oil seals, hydraulic pumps... no high-pressure lines and jacks to keep tight... no freezing up in cold weather as with hydraulics. There are no shock loads as in gravity dumping. You save on regular maintenance time because there is no hoist mechanism to check... only a few places to inspect and lubricate.

Let us show you how these savings can put money in *your* pocket. For proof, we'll be glad to show you performance figures from a job like yours. Or, if you wish, we'll give you names and addresses of nearby owners of Tournapull Rear-Dumps, so you can check the facts for yourself.

Model D — 11 tons, 138 hp

Model C — 22 tons, 208 hp

Model B — 35 tons, 293 hp

Now available with optional tailgate. Prime-mover also powers interchangeable scraper, bottom-dump, flat-bed, crane, logging arch.

Tournapull—Trademark Reg. U.S. Pat. Off. R-1171-G-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 271, page 16

WHERE QUALITY IS A HABIT

The 101-SE is a highly portable plant. The frame is extra strong to hold rigid alignment of all equipment and drives. A rocker beam with full width axles supports most plant weight. Four wheels, each with dual tires, oscillate separately to compensate for rough terrain.

Big Production at your Fingertips with the New AUSTIN-WESTERN push-button controlled Diesel-Electric 101-SE

Here's a high output, mobile gravel plant that combines top efficiency with modern ease of operations and low maintenance. It is DIESEL-ELECTRIFIED, PUSH-BUTTON OPERATED—a triumph in crusher engineering.

All plant components except jaw and roll crushers are electrically operated in this closed circuit plant. All operations are powered with individual electric motors through short coupled V-belt drives, instantly controlled from the operator's platform. Chains, idlers, sprockets and clutches, normal cost items on mechanical plants, are eliminated.

Regardless of load, all components operate at peak efficiency at all times, delivering top production and accurately sized aggregates. A single convenient push-button station controls the plant.

See your nearby Austin-Western distributor . . . or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio, for illustrated booklet.

COMPARE . . . then you'll specify AUSTIN-WESTERN

Welded steel plate crusher frame for high strength without weight of cast steel frame.

Inclined positive-throw type vibrating screen.

All bearings are anti-friction type.

Machined steel toggle plate for absolute protection of crusher.

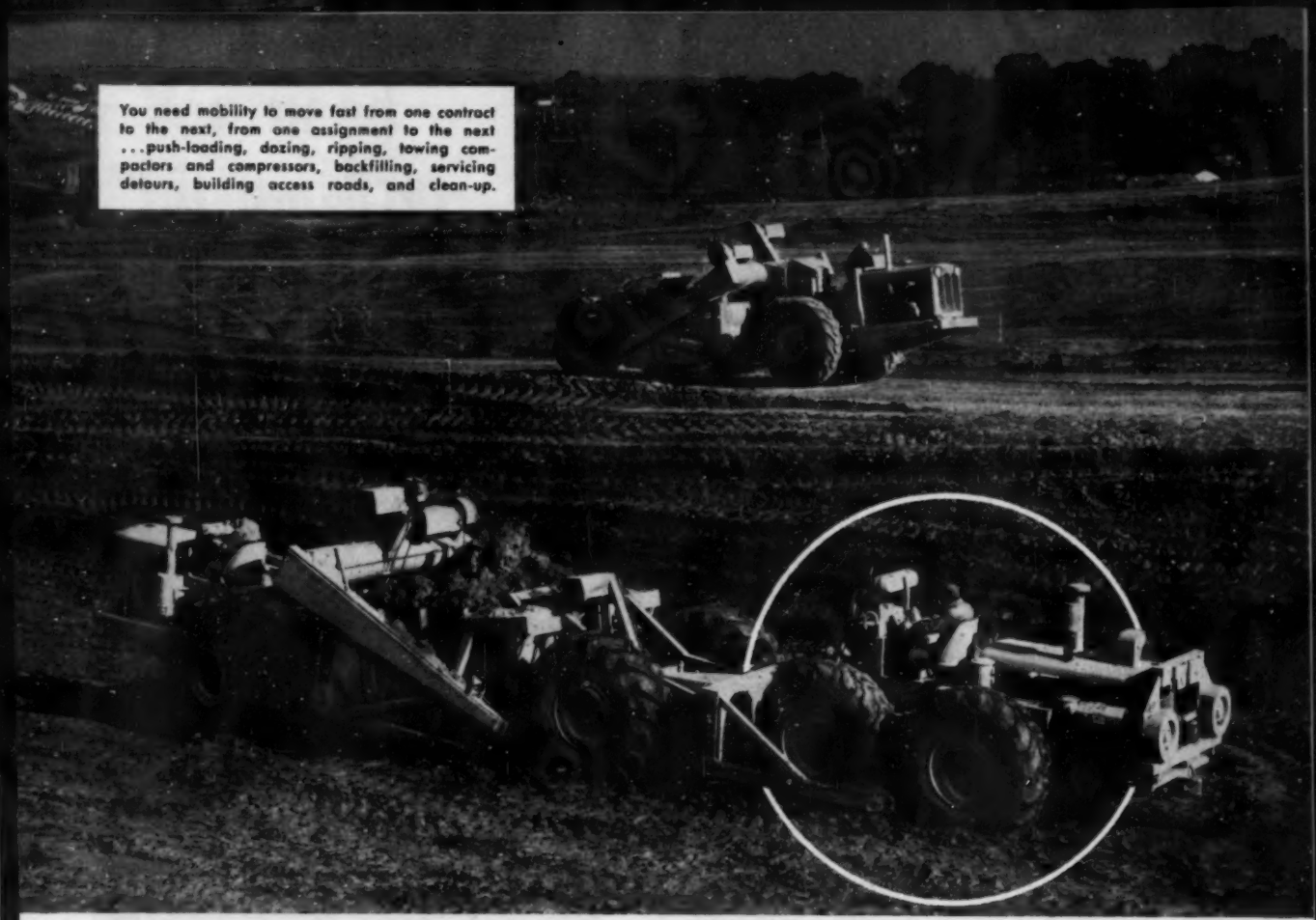
DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

AUSTIN-WESTERN
CRUSHING, SCREENING AND WASHING EQUIPMENT

BALDWIN-LIMA-HAMILTON
Construction Equipment Division — LIMA WORKS

. . . for more details circle 200, page 16

OTHER DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation
Hamilton • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works



What mobility can mean to you

As your business grows bigger, each step involves taking jobs farther and farther apart .. working on wider and longer right-of-ways ... with bigger yardage that breaks into longer work-sections. Also as jobs become more complicated, and equipment more specialized, you find need for more moving around on the job to apply the best tool to each assignment.

So the need for mobility is increasing each year, while, at the same time, the cost of moving track-type equipment designed to slug-it-out in a limited area becomes higher and higher. A truck and trailer must be employed for each move of each piece of crawler equipment. It usually requires two men to load and unload the equipment from the low-boy. Over the years, your tractors have become bigger and heavier; it takes bigger and heavier trucks and trailers to haul them. Also it takes more time and costs more money.

Only a rubber-tired tractor can readily move job-to-job over highways under its own power and thus give you a bonus on each move it makes. Special routes are unnecessary — the rig on rubber rolls over city streets, across bridges, under low overpasses, at speeds to 17 mph. Also your rubber-tired tractor can frequently take time-saving short cuts that would be impossible for truck-and-trailer haul.

Rubber-tired units can save money on-the-job by handling scattered assignments and traveling between them in a matter of minutes. It can also fill in slack periods on your major construction projects with profitable outside rental or contract work.

Find out what mobility means in added profits for you. Compare the rubber-tired Tournatractor with your present crawlers. Write or call for a demonstration.

Tournatractor—Trademark Reg. U.S. Pat. Off. CT-1146-G-b

LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

... for more details circle 272, page 16

WHERE QUALITY IS A HABIT

Hydrocrane Cleans Up the Bottleneck Jobs on Street Repair and Highway Construction

A fast-traveling, smooth-working Bucyrus-Erie Hydrocrane can turn in top profits while handling dozens of digging, lifting, moving, materials handling and clean-up assignments on street repair and highway construction jobs. Equipped with clamshell, it digs manholes, hydrant pits, water, sewer, gas line trench. It loads trucks, handles special digging jobs around bridges and overpasses. Put on a crane hook and you can pull sheeting, handle concrete forms, shoring, timber, as well as lift parts for hooking up other equipment.

With smooth, proved hydraulic power, the Hydrocrane has precision control that ordinary equipment can't match. Telescoping boom permits moving equipment and supplies in and out of close quarters, over and under obstructions without moving the crane an inch. Sturdy outriggers set or retract at the touch of a lever . . . let you set up or get away fast. Highway speeds of up to 50 mph let you get to emergency spots in a hurry — clean up a job — move right on to another trouble spot.

Find out all the ways a Hydrocrane can speed your road-building work. Ask your Bucyrus-Erie distributor about the 5-ton, ⅜-yd. H-3 and (pictured above) the new 10-ton, ½-yd. H-5. 156H56

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN

. . . for more details circle 260, page 16

You need "hit-and-run"

Hauls fill for road shoulders

dirtmovers to supplement your "home-run" hitters

Every "big" dirtmoving job breaks down into work sections . . . some suitable for "big" equipment . . . some suitable for "small" equipment.

The improved D Tournapull fills the need for a fast, flexible, self-propelled scraper which works economically on both big and small-yardage assignments and on both long and short hauls.

Its capacity is 7.3 cubic yards, struck, or 9 cubic yards, heaped. It is large enough and fast enough for profitable use in pusher fleets . . . yet small enough for one-man self-loading. It cuts delays and expense for small-yardage sections, clean-up, access roads, shoulders, drainage and other headache jobs that normally eat into your profits.

Not only is the "D" highly versatile, but it runs from one location to the next at speeds to 29.5 mph. You can road it over highways without special permit, because the improved "D" is only 8′ wide, with axle-load under the 9-ton limit. It works fast . . . moves more earth in less time than big crawler tractor-scraper combinations costing thousands of dollars more than this Tournapull-Scraper.

Pictures show some of typical applications. Look over your current dirtmoving projects and you'll find many of these assignments . . . and others . . . where "D" can speed completion and cut your costs.

If you want more information on the D Tournapull, call or write for full details. Find out how this "hit-and-run" tool can supplement your bigger machines for bigger profits.

Tournapull—Trademark Reg. U. S. Pat. Off. DP-885-G-bw

Backfills around buildings

Shapes backslopes

Fine-grades before paving

Blades shoulders

Cuts drainage ditches

Spreads gravel

Handles clean-up

Spreads top-dressing

Fills hoppers

Does production dirtmoving

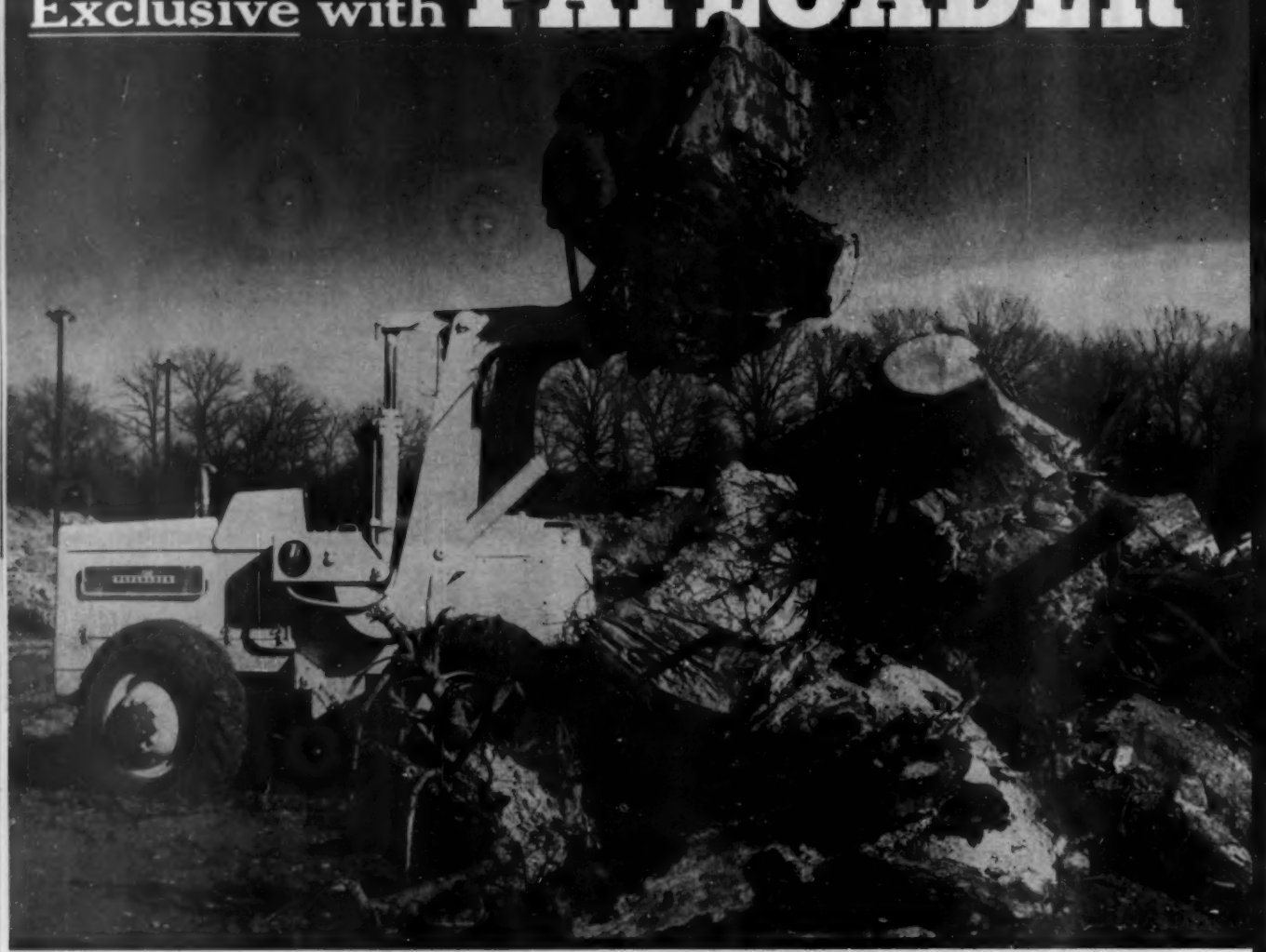
LeTourneau-WESTINGHOUSE Company, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

. . . for more details circle 273, page 16

WHERE QUALITY IS A HABIT

Exclusive with **PAYLOADER®**



DROTT 4-in-1 buckets

The Frank G. Hough Co. is pleased to announce that another valuable attachment has been added to those available exclusively for "PAYLOADER" tractor-shovels. This is the Drott 4-in-1 bucket which, coupled with the power and mobility of the current line of 4-wheel-drive "PAYLOADER" tractor-shovels, gives them greater performance on many jobs, and the ability to handle many operations that usually require special machines.

More than ever before, you get more tractor-shovel when you buy a "PAYLOADER", because you get more tractor-shovel performance and more versatility. They have power-transfer differentials — an exclusive "PAYLOADER" feature that maintains effective traction on mud, gravel, ice and snow. They have no-stop power-shift transmissions and torque converters . . . planetary final drives . . . power steering and 4 wheel power brakes. They have the exclusive bucket motion with 40° tip-back and powerful pry-out action that enables them to dig more, carry more and deliver more . . . to outperform any comparable tractor-shovels.

Your "PAYLOADER" Distributor is anxious to demonstrate what these "PAYLOADER" tractor-shovels and Drott 4-in-one buckets can do for you.

It's a Shovel The four-in-one bucket can always be used as a regular tractor-shovel bucket to dig, carry and dump in the regular manner.

It's a Clamshell Use the powerful clamshell action to clean up small piles, to pick up without tractor travel, to grasp and handle stumps, pipe and timbers fast.

It's a Scraper With slight clam lip opening you have a carry-all scraper that heap-loads itself, carries and spreads thin layers or dumps completely. Strips sod and grades with real accuracy.

It's a Bulldozer Open the clam lip full, and you have a sturdy bulldozer with hydraulic finger-tip blade-pitch control to regulate dozing depth and to discharge sticky material.

help you handle more jobs

OTHER USEFUL ATTACHMENTS

Hydraulic Back-hoes	Land-clearing Rakes
Crane Hooks	Scarifier Teeth
Fork Lifts	Special Buckets
Pusher Plates	Pick-up Street Sweepers
Winches	Rotary Snow Plows
Log and Lumber Grapples	"V" and Blade Plows

The knowledge and experience gained in 35 years, building thousands of tractor-shovels — more than all others combined — is your assurance of superior design, engineering and value when you invest in a "PAYLOADER" tractor-shovel.

PAYLOADER®

MANUFACTURED BY

THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.

SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.

768 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" models with Drott 4-in-1 Buckets as checked:

☐ model HO 2¼ yd. ☐ model HH 1½ yd.

☐ model HU 1 yd.

Name _____

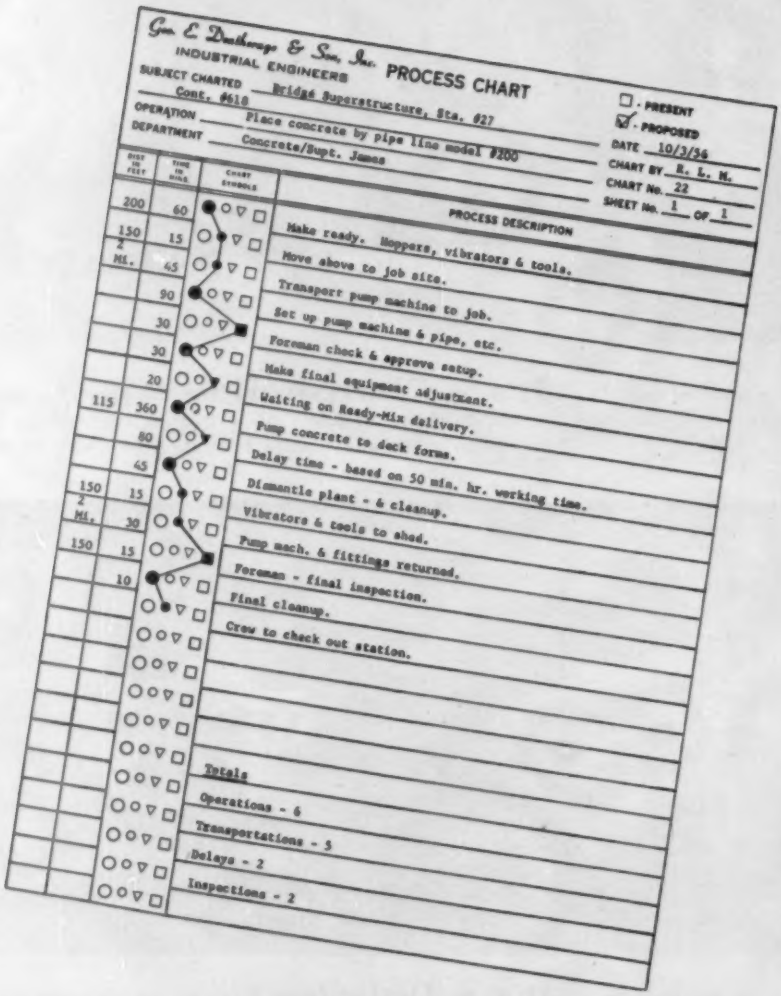
Title _____

Company _____

Street _____

City _____

State _____



Geo. E. Duthrage & Son, Inc. — INDUSTRIAL ENGINEERS

PROCESS CHART

☐ - PRESENT
☑ - PROPOSED

SUBJECT CHARTED — Bridge Superstructure, Sta. 027 Cont. #610
OPERATION — Place concrete by pipe line model #200
DEPARTMENT — Concrete/Supt. James
DATE 10/3/56
CHART BY R. L. M.
CHART No. 22
SHEET No. 1 OF 1

DIST IN FEET	TIME IN MINS.	CHART SYMBOLS	PROCESS DESCRIPTION
200	60		Make ready. Hoppers, vibrators & tools.
150	15		Move above to job site.
2 Mi.	65		Transport pump machine to job.
	90		Set up pump machine & pipe, etc.
	30		Foreman check & approve setup.
	30		Make final equipment adjustment.
	20		Waiting on Ready-Mix delivery.
115	360		Pump concrete to deck forms.
	80		Delay time - based on 50 min. hr. working time.
	45		Dismantle plant - & cleanup.
150	15		Vibrators & tools to shed.
2 Mi.	30		Pump mach. & fittings returned.
150	15		Foreman - final inspection.
	10		Final cleanup.
			Crew to check out station.
			Totals
			Operations - 6
			Transportations - 5
			Delays - 2
			Inspections - 2

● **Figure 1. Office form for use in describing and tabulating the various processing steps, as a preliminary for estimating costs.**

HIGHWAY ESTIMATING

(Continued from page 106)

The small circle indicates a "transportation", or the movement of men or materials from one place to another, except that if the material is within reach of the workman the movement is considered part of the "operation". These latter movements fall, as we shall see later, under the category of "Time and Motion Study" . . . which charts the movement of either hand in performing a task.

The "triangle" indicates a storage (temporary stoppage) or delay. A loaded truck in the process of being unloaded is not delay on the part of the truck and driver. However, if it is awaiting unloading, it is then a delay in the proper sense.

The "square" indicates an "inspection" or "approval", for quantity or quality or to secure information. For instance, reading an order is an "inspection" as is also the act of a foreman or inspector in the process of inspecting work being done . . . measuring, counting, grading, etc.

● In its simplest form, as in Fig. 1, the work to be done or being done (proposed or present) is stated under "subject charted" and then broken down into its various "steps", in the proper sequence, under "process description" . . . wherein it is identified and measured through use of the symbol applying. At the same time there is posted, under its respective column on the left hand side of the sheet, the distance men or materials move (if moved) and the time taken for either the transportation, operation, storage or inspection.

If the charting is indicated in the little square at the top of the sheet as "proposed", the recording of the proposed events under "process description" is a step-by-step posting, in the assumed sequence, of things to be done; such as in mixing concrete. As each step thought necessary is posted (such as wheeling aggregate to hopper), the time to do this and the distance materials move are posted. With the chart completed we now have all the proposed steps necessary to do a specific piece of work set down and measured.

These are the basis of calculating the unit costs for the work and quantity involved.

It is readily seen that this same "step-by-step" process description may be recorded from work actually being done in the field, the time taken, and the distance materials or men or equipment move checked . . . in which case the chart is ticked off in the proper square at the top of the sheet as "present".

● As construction is concerned with work done by men and/or machines with the use of materials, it is vital that, as far as possible, we should elect to chart either or the other. That is, if the prime purpose is to follow or chart the labor, then the plotting under "process description" should follow that only. If the idea is to follow more specifically the machine or the materials, the plotting should hold to that selected. Confusion will result if these various things are mixed up on the same chart. In other words, keep your eye on the ball and do not be side-tracked into charting other than the one item selected . . . and record *every* step in the process.

As previously stated, the use of these simple charts such as Fig. 1 are limited to functions or parts of a process. We have no columns for entering rates of men or equipment, particularly if there are more than one involved, and to arrive at actual costs per step and/or the total cost. This will be covered in a later article under "gang charts".

What then are we accomplishing in the use of this simple chart?

When it is subjected to a detailed analysis, it will show up unnecessary handling, excessive movement of materials, duplication of effort, man-hour inefficiencies, excessive number of steps in the process, etc. A guide to such an analysis follows:

1. What is done? What is the purpose of the step or operation?

2. Why is the work done? What would happen if all or any part of it is not done at all? Is every step or operation necessary?

3. Why does it take so long to do it? Can the time taken on any step be reduced?

4. Who does the work? Who could do it better? Can changes be made to permit a person with less training and skill or a more efficient machine to do the work?

5. Where is the work done? Could it be done somewhere else more economically?

6. When is the work done? Would it better to do it some other time?

7. How is the work done? This suggests the use of machine rather than hand methods or the substitution of another type of machine.

These are only part of the possible questions one might ask about each recorded step in the work process in order to reduce them to a minimum . . . and arrive at the most simple "paper picture" of the method.

Now consider the following:

A. Why do the work at all?

B. Eliminate unnecessary work; steps and operations, transportations, delays and storages etc.

C. Combine any of these steps or operations.

D. Change their sequence.

E. Simplify the necessary steps or operations.

"One Best Method"

The next and final step is to prepare a comparative chart of an alternate method, or a refinement of the present one, wherein all unnecessary steps are eliminated, operations combined, steps simplified, distances materials moved reduced, etc. This should result in a concrete reduction in the number of steps, operations, transportations, delays and inspections . . . the work process being reduced to its lowest terms . . . and the one best method predetermined. As many charts should be prepared as there are alternate methods, assuming that each one improves on the one before to reduce the number of things, distances and times . . . until no further progress can seemingly be made.

● Once we have arrived at the "one best method" the problem is to convert the data into money values. What does each "step", "operation", "delay" or "inspection" cost? We can determine this with this simple chart if we are dealing with only one man whose hourly rate is known, for we have the time taken for each symboled entry. Or we could do the same if we had only one machine whose total hourly ownership/operating rate were known. However, in most cases we will wish to deal with several men or a gang, plus a machine or two; all at different hourly rates and performing different steps in the process simultaneously. It is possible to secure this data through the use of a special process chart known as a "gang chart" and which we will present an article to follow.

The simple chart presented herein is through the courtesy of "Work Methods Manual" by Ralph M. Barnes (John Wiley & Sons). Although not written for the construction industry, this little book of 136 pages will quickly inform those interested as to the basic principles of "Work Simplification" methods and procedures, upon which their application to the construction industry is based.

Gang Process Charts

Thus the reader is introduced to the use and application of Simple Process charts, with their simple symbolic shorthand, the large circle for an operation, the small circle for a transportation, the triangle for a storage or delay, and the square as an inspection or approval; to identify the work being done or to be done. This, as one of the industrial engineering techniques of making a "paper picture" of the steps in getting work done. This as a means of reducing the work to the fewest and most economical steps in the process.

It is emphasized again that these simple charts have their limitations, inasmuch as they do not permit one to calculate the cost of each step in the work process, when more than one man or machine is engaged simultaneously and at different rates. The "Gang Process Chart" as presented herein overcomes these deficiencies and enables the actual cost of each step, operation, transportation, storage delay and inspection or approval to be calculated to the last penny—and a total unit cost to be arrived at.

Such Gang Process Charts have a dual use: (1) for the estimator in setting up the details of a proposed item of work, step by step, and estimating its cost; and also (2) for the contractor to check his field costs and to determine exactly what is wrong with the job or cost under way.

At this stage it might be well to point out that the word "operation" is used in an industrial engineering in somewhat of a dual sense. First, it is traditional when referring to a job being done—as an "operation," such as the operation of "mixing concrete." We also use it as a term to define work being done as part of a step in the process, identified by the large circle in the symbolic shorthand. In other words, we may identify the major job being done as an "operation"—then break the major "operation" down into various steps; further breaking the steps down to smaller "operations," transportations, storages and inspections—as per the symbols. A "step" in a process may consist of one or more smaller "operations," transportations, storages, delays or inspections—each identified by its proper symbol.

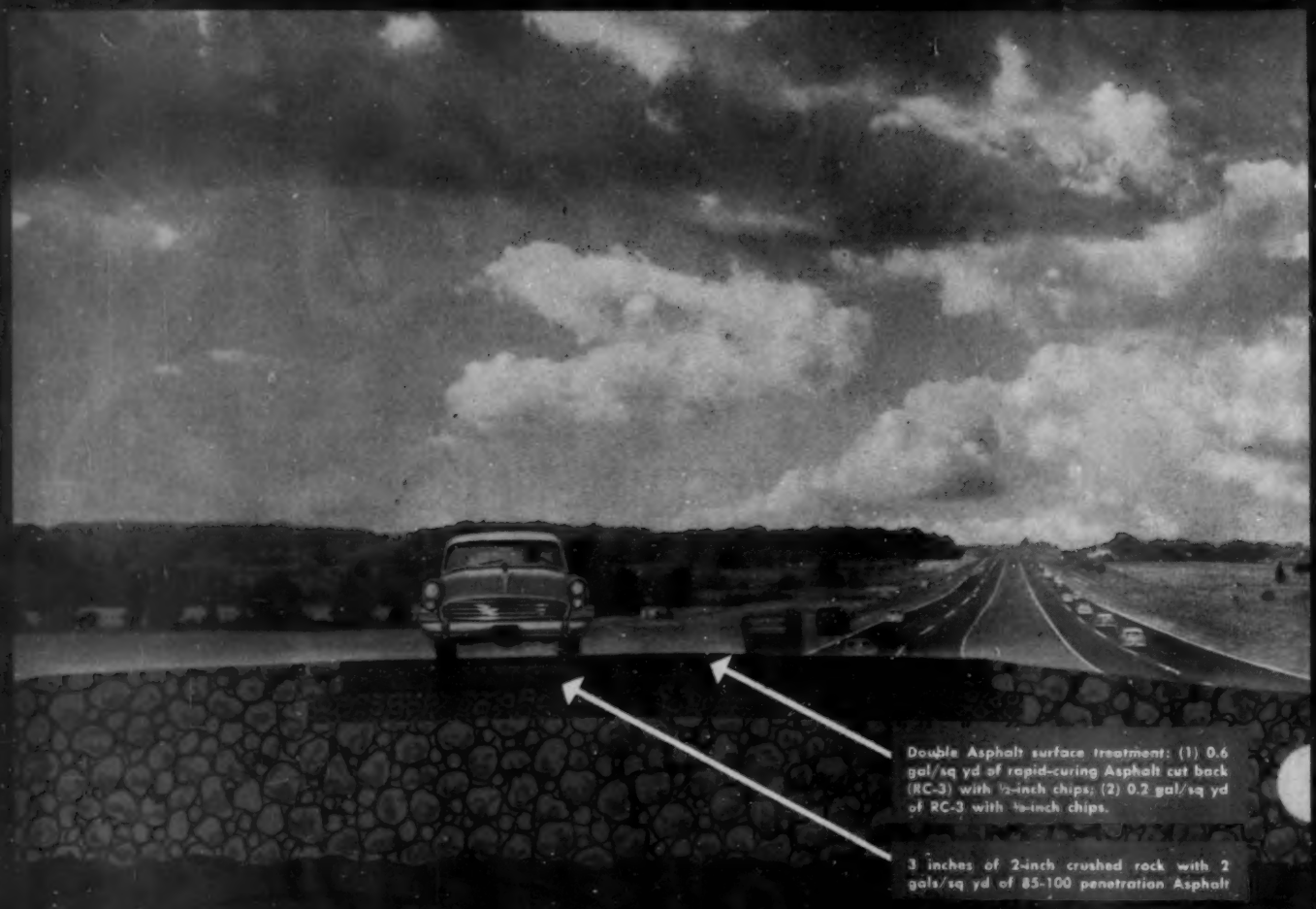
Referring to the Gang Process Chart, we first fill out the heading which locates the work being done or to be done, describes the work in detail, states the amount of work concerned and gives a general description of the plant to be used etc.

● *In selecting* the work process to be charted it is always best to break this down into the simplest work classifications. For instance, selecting a broad work classification as "Excavating and placing Foundations" includes not only excavating, sheeting and bracing, building forms, setting steel etc., and involves too many factors to properly visualize or account for. Such a broad classification should be broken down into its various sub-sections . . . such as excavating, sheeting or piling, forms, setting steel, mix and place concrete etc. Generally the finer the breakdown the more simple and accurate the chart becomes. A breakdown in accordance with cost code classifications is recommended, for in this case, if the charting is being done to check work under way—the unit cost arrived at can be directly compared with the estimated unit labor cost.

In using the Gang Chart, we set down each man and machine which are being used on this particular major operation. And above this we write in the hourly rate. For machines, the hourly rate is the rental rate per hour or the total hourly ownership/operating cost. It is best to confine the charting to one shift of 8 hours or 480 minutes. Here then we have listed the supervision, the men of all trades engaged at their different rates and the machine or machines at their going rates—including the operators, oilers etc.; as well as the fuel etc.

Next, referring once more to the gang chart, we set down in the right-hand column the various steps taken to do the work in their proper sequence, or selected sequence. If the chart is to be used for building up figures for an estimated cost, it is an assumed sequence. If it is a "present" chart, that of recording work being done in the field, it is the actual se-

(Continued on page 126)



This ASPHALT superhighway costs New Hampshire

Since June 25, 1950, this New Hampshire Toll Road has been proof-in-operation of Asphalt pavement economy. Low in first cost. Low in maintenance cost.

ASPHALT construction saved $85,000 per mile in *first* costs, as well

Yes! This is the figure reported by New Hampshire authorities. $36.07. That's for maintaining pavement alone . . . all four lanes. The average cost per mile, per year during the first five years operation of New Hampshire's 14.7-mile Asphalt Turnpike . . . linking Asphalt Turnpikes of Maine and Massachusetts.

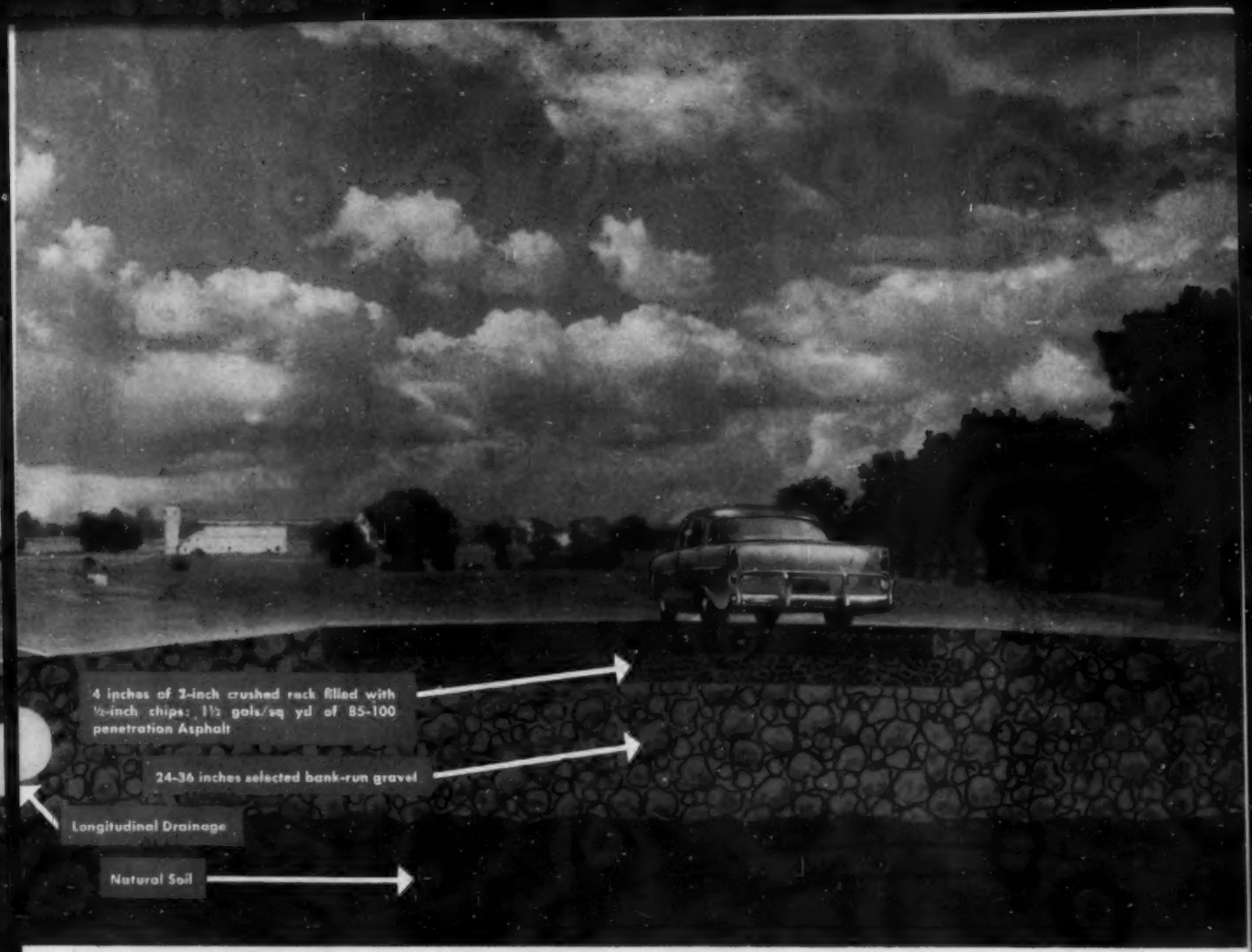
What's the five-year overall total? $2,651.06! Per year? $530.21! Per vehicle? (there were 14,520,723 of them) $.000175!

Can these be considered "yardstick" figures?

Yes! Other modern heavy-duty Asphalt pavements that carry heavy traffic and are in areas of severe weather variation have maintenance costs comparable to these. These maintenance figures seem remarkable . . . almost unbelievable . . . but such remarkable savings can be expected when heavy-duty rugged Asphalt pavements are properly engineered and constructed.

How was this low-maintenance pavement designed?

The section above shows basic construction . . . first a carefully selected sub-base, then two courses of Asphalt penetration



only $36.07 to maintain (per mile, per year)

macadam, topped with a double Asphalt surface treatment. Most sub-base material came from the right-of-way or adjacent borrow.

Bids for the Asphalt structure ran $85,000 per mile under next lowest bids for pavement of comparable specifications. Such a saving pays for many years of maintenance . . . not only of the pavement but of the entire right-of-way.

What about performance?

John O. Morton, New Hampshire Commissioner of Public Works and Highways, has this to say, "The pavement has shown performance during its first five years of use that leaves nothing to be desired."

For low costs, long life, high performance . . . for smooth, safe riding . . . design for Asphalt construction.

Safety is not a function of cost

Despite its low construction and maintenance costs, New Hampshire's Asphalt Turnpike has achieved one of the best safety records on major highways in the nation.

THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Maryland

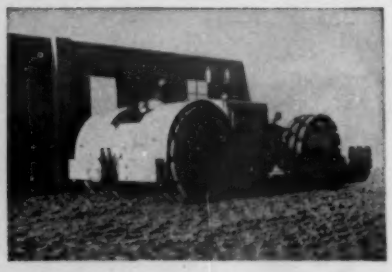
. . . for more details circle 258, page 16

How to meet density specs { *in fewer passes* / *at less cost*

Use the BUFFALO-SPRINGFIELD K-45 KOMPACTOR

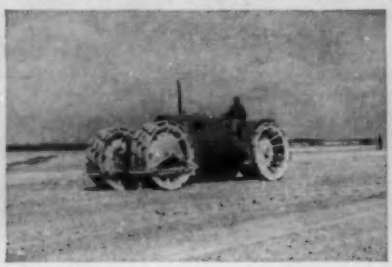
CLAY ON PLANT SITE—One of 3 KOMPACTORS compacting nearly 90 acres of clay with some sand and some muck pockets on a plant site near Novi, Michigan. The contractor said that the KOMPACTORS were the only machines that would do a satisfactory job of compacting the clay found on this particular job.

CLOSE TO CULVERTS—The K-45 eliminates hand tamping on culverts such as this. On this one contract, 6 concrete box culverts in 12.726 miles of highway made close compaction a necessity. The KOMPACTOR also averaged 1100 yds. an hour on banked material—due to faster speeds and more uniform compaction, replaced other equipment.



"AN INSIDE JOB"—What other piece of compaction equipment could go inside the building and work right up to the walls? This self-propelled, reversible, highly maneuverable K-45 KOMPACTOR is compacting the earthen sub-base over which the cement floor will be laid. No hand tamping required—time and labor costs greatly reduced.

THIS K-45 worked at speeds of 5 to 6 mph compacting fill fast on a Texas airport construction job. There was no difficulty in meeting 100% density specification . . . only 2 to 4 passes by the big, self-propelled, 32,000 lb. K-45 were required. The contractor attained 500 to 600 cubic yards compaction per hour.



SAVES AN OPERATION—One entire operation, running coral rock through a crusher for base material, was saved by the K-45 on a Florida air base job. The self-propelled KOMPACTOR followed a tractor and a rooter to meet density specifications. Such highly efficient operation is another reason for the K-45's wide-spread popularity.

"TURNS ON A DIME!"—comparatively. Because the K-45 KOMPACTOR is self-propelled and operates at fast speeds of 5 to 6 miles an hour either forward or backward with equal ease, it is highly maneuverable. Its turning radius can't be matched even remotely by tractor-drawn compaction equipment. Saves time. All compaction is downward.

RECORD COMPACTION time in meeting density specifications on a $1,736,000 California highway construction job resulted from use of this KOMPACTOR. Just what quick results were obtained are shown graphically by the two unretouched photos of the soil (right). The first soil photo shows the material, before compaction, on the Ventura-Ojai, California road project. The second photo shows identically the same area after just 3 passes by the K-45 KOMPACTOR. (The pack of cigarettes in both photos is the same—see circles—and is shown for comparative size.) Fast speeds of 4 to 5 miles per hour by the self-propelled K-45 were maintained on this job.

● The K-45's "Interrupted Pressure Principle" of compaction does a better, more uniform job—provides minimum displacement of loose materials either forward or sideways—directs *all* compaction effort downward—requires *fewer* passes.

BUFFALO-SPRINGFIELD
Roller Division-Koehring Company
SPRINGFIELD, OHIO

Write today for full information, or see your nearest Buffalo-Springfield distributor.

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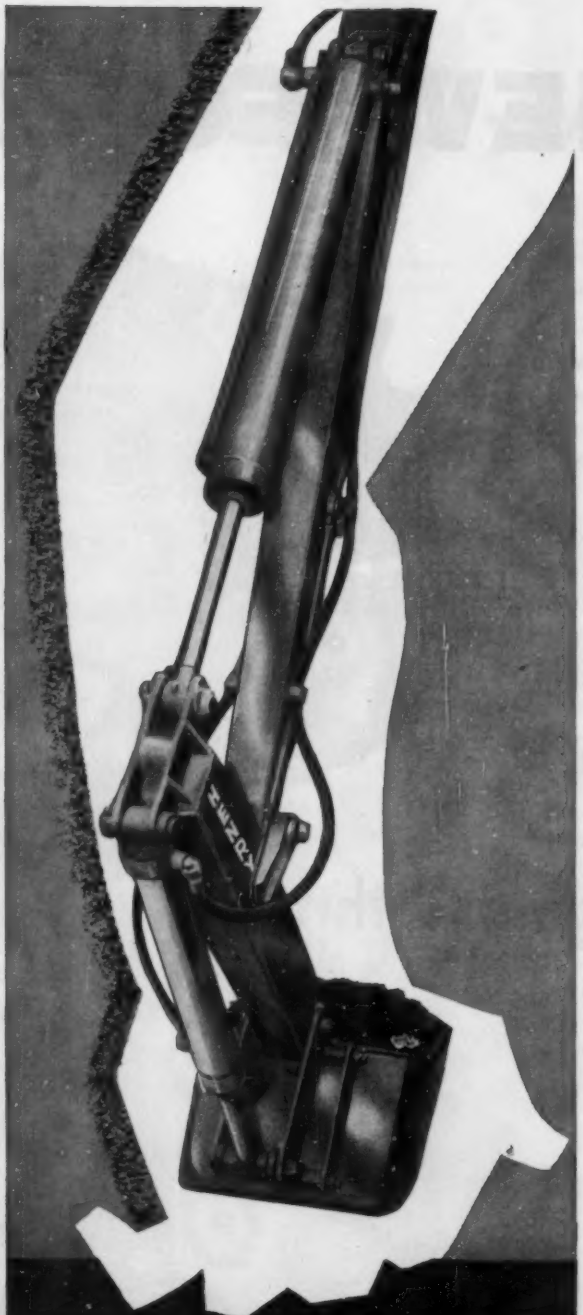

LIKE A STRONG RIGHT ARM

What muscles can do in hours, the new 1957 HENRY HYDRAULIC BACKHOE C-10H accomplishes in minutes. This powerful Henry never quits . . . it bites through hard ground with smooth multi-cylinder action. Selection of 16 bucket sizes, from 12" to 38".

"You can do it BETTER with a HENRY!"

HENRY MANUFACTURING COMPANY, INC.
1700 N. CLAY STREET • TOPEKA, KANSAS

COAST TO COAST SALES AND SERVICE

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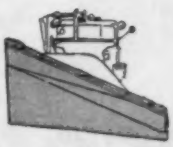
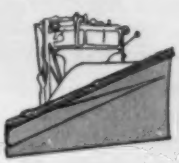
For Airports and Dual Highways





The Frink Taper Blade Roll-Over Sno-Plow combines the advantages of the reversible blade type with higher speed, deeper snow handling qualities of the one-way plow.

This plow throws and spreads the snow, yet can be hydraulically rotated from left hand to right hand plowing position in 15 seconds, enabling the operator to throw *all* the snow in the most favorable direction as dictated by the wind or the location of the disposal area.

Deadheading is eliminated, therefore, less equipment is needed. Parking is easier, because the truck can be parked with the Roll-Over in the upright position within its own width.

The Frink V-Type, One-Way Type, and Reversible Type Sno-Plows can all be attached to the Roll-Over Lifting Device Assembly.

FRINK SNO-PLOWS

Clayton, 1000 Islands, New York

Made in Canada by
Frink Sno-Plows of Canada, Ltd., Toronto, Ontario

. . . for more details circle 218, page 16

LOOK! NEW FORD

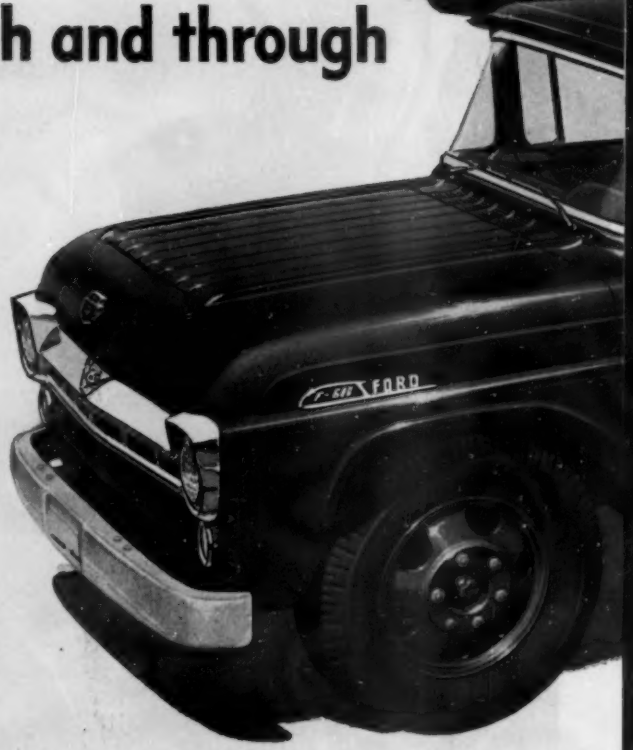
The boldly modern styling you see in new Ford trucks for '57 only *hints* at how deep-down modern they really are!

These deep-down modern Fords bring you important new advances in power, more durable frames, stronger axles and springs, and completely new stronger cabs with structural design improvements.

'57 Ford trucks are so modern . . . *so new* you've just got to see what they can do. Get in touch with your Ford Dealer now.

LOOK again!

They're modern through and through



NEW cabs—completely new—stronger, roomier, smarter! New wider full-wrap windshield. New inboard cab step, new Hi-Dri ventilation, new easy-to-read instrument panel!

NEW hydraulic clutch, standard in all models from pickups to tandems. Easier to operate—works like hydraulic brakes. Clutch and brake pedals are suspended type for extra driving ease!

NEW Styleside pickup bodies, standard at no extra cost. America's biggest pickup bodies! Built wider with all-steel rugged box-section corner reinforcements and recessed taillights. Side loading's far easier with full-width body.

NEW riding comfort! A completely new suspension, big roomy cabs with increased visibility, greatly improved riding and handling ease.

NEW chassis and body strength! New frames, up to 13% stronger. New sturdier axles! New higher capacity springs! New stronger, more durable cabs.

NEW power advances! New higher horsepower, new freer breathing, new higher compression, new Super-Filter air cleaner. New advancements from camshafts to carburetors! Modern Short Stroke design in every engine—V-8 or Six.

TRUCKS *for* '57

New T-800 Tandem, 45,000-lb. GVW. High torque 212-hp V-8 engine, 4-barrel carburetor and power steering, standard at no extra cost.

New F-100 pickup with Styleside body standard at no extra cost. Half-ton models are available in either 6½- or 8-foot body lengths.

New F-600 2-tonner has higher horsepower and more rugged chassis construction. More payload capacity than any other 2-tonner.

For '57 and the years ahead —

FORD TRUCKS COST LESS

. . . LESS TO OWN . . . LESS TO RUN . . . LAST LONGER, TOO!

. . . for more details circle 266, page 16

(Continued from page 119)

quence in which the work is being performed.

It will be noted that the column headed—"step Description" is numbered consecutively and, as we shall see later, there is a reason for this.

As the work is done, or assumed to be done, in case of building up a theoretical unit cost for estimating, there is posted opposite the "Step"; the time taken or charged to this, for each man or machine on the job . . . and at the same time, identified by the proper symbol—whether the time is charged to an "operation" as part of the Step, to a transportation, storage or inspection. The "Step. No." is posted inside the symbol as in the illustration.

As far as possible all the machines and men should be kept together on this one line and each one accounted for by the number of minutes posted in the adjacent lefthand column. If, over *this same period of time*, a man or machine is working on; for instance, Step No. 2—this does not preclude it

(Continued on page 132)

GANG CHART

Chart No. 23
Location Sta. #27
Charted By R.L.M.
Unit Cu. Yd.
Actual Cost
Present
Proposed ✓ For Estimate

Dwg. No. 137-B1
Subject Bridge Superstructure Concrete
Date 10/3/56 Code 5-11-7
Work Cycle Place conc. by pipe line Cont. No. 618
Est. Quantity 180 Dept. Conc. Est. Cost 2.26
Plant Equipment Pumpcrete Model #200
Supt. James Foreman Atkins

DIST.	TIME	Foreman	Pump Operator	Hopper Man	Laborer	Laborer	Laborer	Laborer	Vibrator Man	Vibrator Man	Pump & Fittings	Truck & Driver	COSTS	No.	Step Description
Hourly Rates		3.00	2.52	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.50	6.00			No.in Gang - 9
															Steps
				②	①	①	①	①	①	①			14.67	1	Make ready - tools.
200	60	①											3.15	2	Move to job site.
150	15	②	③	②	②	②	②	②	②	②	③	③	18.27	3	Pump mach. to job.
2 Mi.	45		③										59.59	4	Setup mach. time.
	90	④	④	④	④	④	④	④	④	④	A		7.80	5	Inspection.
	30	5	①	①	④	④	④	④	④	④	A		3.57	6	Mach. adjusting.
	30	⑥	⑥	⑥	④	④	④	④	④	④	A		10.04	7	Delay - Ready-Mix.
	20	7	7	7	7	7	7	7	7	7	7		198.13	8	Pump concrete to Deck Forms.
115	360	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧	⑧		57.20	9	50 min. hr. Normal delay.
	80	9	9	9	9	9	9	9	9	9	9		14.08	10	Dismantle pump.
	45		⑩	⑩	⑩	⑧	⑧	⑩	⑩	⑧	⑩		4.18	11	Tools to shed.
150	15		⑩	⑩	⑪	⑪	⑪	⑪	⑪	⑪	10	⑫	12.57	12	Return pump.
2 Mi.	30	5	⑫	⑫	⑬	⑬	⑬	⑬	⑬	⑬	10		4.80	13	Final Cleanup.
	10												1.15	14	Crew--check out.
	5				⑭	⑭	⑭	⑭	⑭	⑭			407.02	15	
														16	
														17	
														18	
					Vibrators & Tools in Plant Setup.										
													Totals		Summary
Min			715	760	775	780	780	780	780	780	780	745	75		Operations 6
Hrs			11.92	12.67	12.92	13	13	13	13	13	13	12.42	1.25	129.18	Transports 5
$			35.76	31.99	20.67	20.80	20.80	20.80	20.80	20.80	20.80	19.90	7.50	407.02	Delays 5
															Inspections 2
															Quantity 180 C.Y.
															Unit MH -7176
															Unit Cost 2.26

● **Typical gang process chart sheet, filled out for an estimating task.**

Rugged Work and a hose to match!

U. S. 4810 Air Hose

Jagged rocks, grinding gravel, severe cold and sun checking, punishing impacts from heavy equipment—all these were faced *and licked* by the "U. S." engineers who designed U. S. 4810. Reason enough why it's become one of the most popular of all hose for mines, quarries, shipyards and general construction work.

Combining super adhesion, great strength, high resistance to cuts and abrasion, and extreme *flexibility*, U. S. 4810 is recommended for all pneumatic tools and air drills, for use *wherever* high working pressures, abrasion, and general abuse pose problems.

Whatever your hose requirements, you'll find it pays to turn to "U. S." There's a job-engineered U. S. Hose for practically every purpose—an expert staff of "U. S." Engineers to assist you with your hose selection.

Service-packed, economical U. S. 4810 Air Hose is available from any of our 27 District Sales Offices, or by writing to us at Rockefeller Center, New York 20, N. Y.

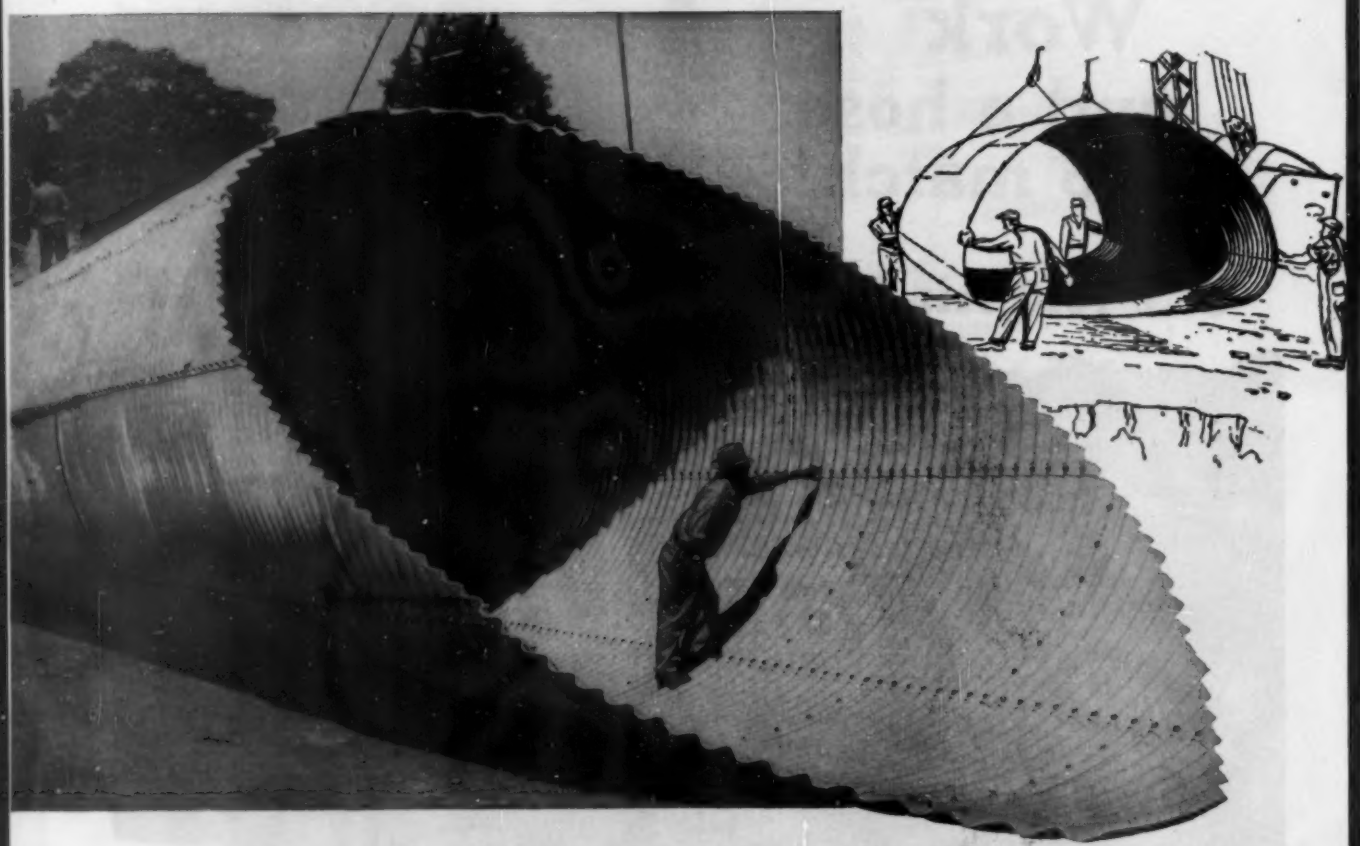
- tough, flexible tube of neoprene provides top oil resistance
- high-tenacity, tire-type cable rayon braids give tremendous carcass strength
- thick cover of cut-resistant natural rubber wards off damage from rocks, tools, and equipment

Mechanical Goods Division

United States Rubber

. . . for more details circle 254, page 16

For Permanence, Economy, and
TWO USS PRODUCTS FOR
LARGE OR



USS AMBRIDGE SECTIONAL PLATE

PIPE • PIPE-ARCH • ARCH

USS AMBRIDGE Sectional Plate Pipe, Pipe-Arches and Arches are available in a *complete range* of standard sizes to satisfy design requirements for any waterway opening. These flexible structures, with their 6″ x 2″ corrugations, can resist extremely large externally applied loads.

Special details such as asphalt coating, hook bolts, beveled ends, and skewed ends are furnished as specified for each job. These structures are economical, permanent, and go in quickly with minimum traffic interruption.

SEND FOR NEW CATALOG

Containing complete information on AMBRIDGE Sectional Plate, our new 28-page catalog covers such details as design, sizes, weights, gages, and assembly instructions. For your free copy, just send your request to American Bridge Division, U. S. Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

USS

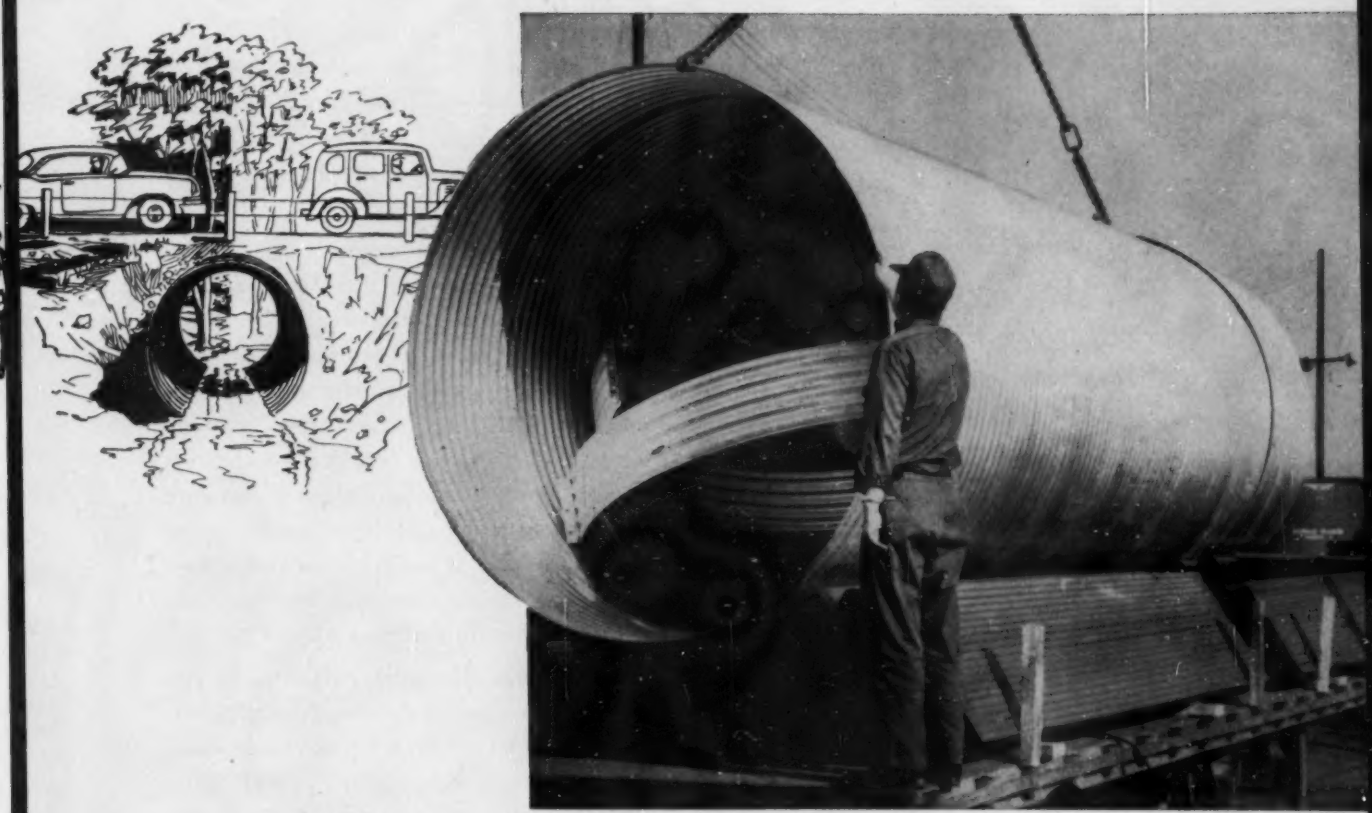
AMERICAN BRIDGE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: 525 WILLIAM PENN PLACE, PITTSBURGH, PA.

UNITED STATES STEEL

Speed of Installation

DRAINAGE STRUCTURES

SMALL



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Culverts made from USS Galvanized Corrugated Culvert Sheets provide a lasting economical means of handling drainage problems. They will carry more load than rigid-type structures, and readily absorb the forces of impact and vibration.

These advantages, plus the fact that metal culverts are not subject to breakage, require no maintenance, cost less to install and are easy to ship and handle, make them ideal for most drainage purposes.

NEW CATALOG AVAILABLE SOON. We are completing a new catalog on USS Culvert Sheets for Metal Drainage Products. Covers design, sizes and weights, gages, installation and other engineering details. For free copy, send your request to United States Steel Corporation, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

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. . . for more details circle 293, page 16

7-455

UNITED STATES STEEL

For profitable performance

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Gar Wood-Buckeye 308 . . . the job-proved standard on grueling cross-country work. Split-shaft excavator drive provides equal power to each drive pinion . . . ends misalignment wear. Hydraulic wheel hoist permits quick adjustment for depth and grade. Simple, grouped controls offer ease of operation. Hydraulic conveyor drive is instantly controlled . . . no complicated shifting . . . never any need to leave the operator's seat!

New Gar Wood ripper is balanced to the power and weight of Euclid TC-12 tractors. Revolutionary swivel-type ripper teeth increase tractor maneuverability . . . save time on turns because they don't have to be lifted out of the ground. Easily and quickly controlled by famed Gar Wood hydraulic system. King-pin construction makes it easy to change pitch of each tooth, adjust for maximum penetration regardless of digging conditions.

Performance, the kind you can depend on regardless of job conditions, demands advanced design as well as quality construction of equipment. You get both when you go Gar Wood!

In excavators, for example, Gar Wood has developed performance features that insure maximum production. Independent chain crowd puts full engine power into every bite on shovel applications. Independent travel lets operator hoist or swing while moving. Direct gear drive and direct manual controls make for fast, accurate control on precision jobs. And just as important, Gar Wood's job-proved heavy-duty construction results in long unit-life with minimum maintenance!

If your work demands performance you can count on, take a *good* look at the complete line of Gar Wood truck equipment and construction machinery. Call your Gar Wood dealer, or write to: Customer Service Dept., Gar Wood Industries, Inc., Wayne, Michigan.

Gar Wood-St. Paul hoists and dump bodies . . . real performance-twins! Integral construction of lift-arms with a torque tube prevents one-sided lifting strains. This means fast, safe dumping . . . even on steep grades! Extra-rugged body construction at critical stress points eliminates spreading, warping or sagging! There's a full line of Gar Wood-St. Paul hoists and dump bodies in all capacities . . . one for your job!

GAR WOOD

PLANTS IN WAYNE AND

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Gar Wood 75's stand up longer . . . perform better! Heavy-duty conical-hook double rollers eliminate pin strain and rocking under load. Massive crawler base is built to stand up under the heaviest shocks and strains. Large-capacity drums and sheaves make for perfect spooling, longer cable life! Hydraulic coupling, capable of absorbing shock loads, is optional equipment.

INDUSTRIES, INC. Wayne, Michigan

YPSILANTI, MICH.; FINDLAY, OHIO; MATTOON, Ill.; RICHMOND, CALIF.

. . . for more details circle 221, page 16

HIGHWAY ESTIMATING

(Continued from page 126)

from being carried on the Step No. 1 line, as the figure (2) is written inside the symbol and the time charged to Step No. 2.

It may be seen therefore, that every man or machine in the gang may be working on different "Steps" in the process simultaneously, but appear on the same line, as long as the proper Step. No. appears inside the symbol indicating what he is doing, and the time consumed is the same.

● *It is only when* a man or machine, or several of them, are pulled out of the gang operations for a while (a shorter time), that a new line entry must be made. Then the posted time element for the gang would not apply to him. All men can be kept together on one line as long as the time spent is the same for each and every one of them. For instance if the gang spends 120 minutes together, irrespective of what they are doing, everything is fine. Should we keep a man with them for 60 minutes and then move him off to Step. No. 3 for 30 minutes, there will have to be separate line entries.

In plotting one must always keep in mind that each man must be accounted for for the full 8 hours or 480 minutes, as totaled finally at the bottom of the sheet. If there is overtime used, a small crossmark is made at the time in the proper square for the man opposite the proper step.

It is apparent that by this system of process charting we can identify every man and/or machine on the work, identify what he was doing for every minute if we care to do so. Whether he is performing a necessary operation, is moving materials, is delayed, loafing or occupied in an inspection-counting measuring or grading.

In addition, we can calculate the actual cost of each individual "Step" as appears on the right hand side of the sheet—and add these up to secure the total overall cost of the operation being charted. On the bottom of the sheet we also total the values for each man in minutes/hours/dollars. We can go farther and calculate easily the cost of each "operation" in a "step," each move of materials, each delay or storage and the cost of supervision and/or the inspection. And we can do so, if we desire, down to the last minute/and penny.

By posting the amount of work done in the respective right hand column, we can total this and by dividing by the dollar cost—arrive at the unit cost of the major operation as a whole.

● *By posting the distances* materials move on the left hand side of the sheet we can determine the cost of moving them per unit and determine whether this is in line or not.

It is now quite clear that, as an estimator, we wish to build up a theoretical unit cost for work to be done we simply break the job down into its various "Steps" in an assumed proper sequence. We then establish the men and machines that we estimate to do this work—the gang and, estimate the time it will take them to do each of these things. As long as we are dealing with only one Step, operation, transportation, storage or inspection at a time—it is comparatively easy to be accurate—as opposed to estimating time and production for an entire crew, particularly if the job is not a standard one on which we have historical knowledge and costs.

It is also apparent that, by using the same methods we can accurately check the actual performance of field work and, where a cost is out of line, put our finger unerringly on what is wrong.

In the business of "Methods Preplanning," either before the job is priced, or after the work is secured and it is required that the best and most economical method be determined, the Gang Process Chart is the vehicle used. Depending on the size of the job and the time available for charting, analysis etc.—several alternate methods charts may be devised and the probable unit costs pre-determined.

"Work Simplification"

It is not presumed that the construction business will fall over itself to spend the time, effort and money to use these "Work Simplification" methods to arrive at estimated unit costs, or in the pre-planning of the work. All contractors are intensely interested in better planning on the job in order to increase production and secure lower costs. But—as a general rule they do not know how to go about it. There is no easy way out of methods preplanning except to take the time and trouble to use the tools which industrial engineering has provided them. It is the only possible way that production can be increased and costs lowered. The manufacturing and process industries have found that out the hard way.

● *This brings up the question,* that if the contractors are not prepared to determine and put into practice the most economical methods to do work, on account of various entering factors, such as the cost of doing it or having it done—should not the State enter into this responsibility?

After all, we now witness to some extent the acceptance of payment based on earthwork quantities established on the original plans, or quantity payment based on aerial survey, the stipulations in specifications that certain types and/or makes of equipment be used to secure a specified result, stockpiling of materials by the State in case of shortages, standardization of plans for structures enabling the use of master sets of forms etc. How long will it be before the State also takes as part of its responsibility, the pre-determination of methods to secure greater speed and lower costs—or insist that the Contractor produce evidence that he has, can or will do so?

It is realized that contractors as a whole will raise their hands in horror as to this invasion of their privacy. But—according to the Nashville, Tenn., Contractor's Weekly Bulletin, "In 1946 the average percent of profit on completed construction work was 3.4%. By 1948 profits had reached 3.6%. However by 1951 they had dropped to 1.8% and an unbelievable low of 1.3% by 1952. The increasing number of contractor failures (from 94 in '45 to 1404 in '55) leaves us no alternative but to assume that the same figure is about true presently." Is it not therefore, time to put modern preplanning techniques into action?

● *In conclusion* it is pointed out that in this article we have presented Simple and Gang Process Charting as a means of methods analysis and preplanning. In using these charts the one thing that has not been taken into consideration when reviewing alternate methods, is the required amount of materials in one method over another. This phase will be covered in the article to follow.

Editor's Note: The first part of this article, that pertaining to Simple Process Charts, is here repeated from December Roads and Streets, where it was run without a headline banner due to a printing error. The article originally intended to be published in two parts thus is reproduced as a single summary for the reader's convenient reference.

MURRAY NEW OTC ASST. SALES MGR. Bill Murray, formerly credit manager and supervisor of customer sales, has been appointed assistant sales manager of Owatonna Tool Co., Owatonna, Minn. He will work with Robert L. Allyn assisting him in sales planning and administration.

Now . . . most power of the low-priced 3

New DODGE *PowerGiants*

1957 line-up gives you up to 232 hp.

Dodge tops the low-priced field in V-8 power by a big margin—actually delivers as much as *31% more!* This *extra* power in reserve saves engine strain . . . wear . . . excessive repairs. What's more, Dodge V-8's use *regular* gas, help keep your cost per ton-mile *down!*

Extra payload capacity. You can haul more—up to 73% more in the 300 model pick-up, for example.

Extra handling ease. Exclusive push-button automatic transmission*! Sharpest turning and easiest steering in the industry!

See the new *Power Giant* line-up now at your Dodge dealer's. You'll see features that prove it pays to get your Dodge dealer's deal before you decide on *any* truck.

**Available on all low-tonnage and Forward-Control models.*

DODGE meets your hauling needs!

Conv. Models	Max. G.V.W.	Max. G.C.W.	Max. V-8 HP.
100	5,100 lbs.	—	204
200	7,500 lbs.	—	204
300	8,800 lbs.	—	204
400	15,000 lbs.	26,000 lbs.	197
500	18,000 lbs.	32,000 lbs.	197
600	21,000 lbs.	35,000 lbs.	197
700	23,000 lbs.	45,000 lbs.	216
800	25,000 lbs.	55,000 lbs.	222
900	30,000 lbs.	65,000 lbs.	232
Forward-Control Models			
P300	9,000 lbs.	—	204
P500	15,000 lbs.	—	204
C.O.E. Models			
C500	18,000 lbs.	32,000 lbs.	197
C600	21,000 lbs.	35,000 lbs.	197
C700	22,500 lbs.	45,000 lbs.	216
Tandem Models			
T700	32,000 lbs.	45,000 lbs.	216
T800	36,000 lbs.	55,000 lbs.	222
T900	46,000 lbs.	65,000 lbs.	232

DODGE TRUCKS

WITH THE *FORWARD* LOOK

Pick-ups

Stakes

Tractors

. . . for more details circle 295, page 16

Semi-Automatic Rebuilding of SHEEPSFOOT TAMPERS

A novel idea for salvaging sheepsfoot tampers, with a saving of 45% in cost and 50% in down time, originated with Dave Moodie, master mechanic of J. A. Thompson and Son, large West Coast contracting firm.

As routine maintenance procedure the 220 individual tamper boots on each of the 24 compactors operated by this firm were manually hard-faced until recently in a circle-and-cross pattern; the tamps lasted three or four months before a loss of gauge made them no longer usable. In an eight hour shift the maintenance weldor could manually rebuild and hard-face 18 worn tamps.

Since the firm installed a semi-automatic welder adapted to the use of Stoody 7/64" wires, the picture has altered completely. Today the weldor, using Stoody 121, *rebuilds 70 worn tampers in a single shift!* Mr. Moodie's procedure employs "weld-casting" of the wearing face, using a split carbon mold of the correct finish dimensions. Stoody 121 is applied by the semi-automatic welder, with the mold shaping the large puddle to produce a hard-faced wearing surface of the required depth and gauge.

The rebuilt tampers hold their size twice as long at a considerably lower cost than hard-faced standard replacement boots. Material and labor are approximately $1.25 each for the rebuilt tamper.

You will find many suggestions for prolonging the life of all types of heavy equipment in the Stoody Guidebook. Your Stoody dealer has a copy for you. Look him up in the "Yellow Pages" of your phone book or write direct.

More speed, easier build-up and automatic sizing are obtained by this carbon mold clamped around the sheepsfoot tamper. Stoody 121 wire is applied semi-automatically.

Mold is machined to correct size, grips stem tightly to hold weld metal on wearing surface.

Notice how gauge is still held after 4 months service. Impact strength of Stoody 121 withstands repeated blows of twelve pound sledge used to seat and align tamps during installation.

Bituminous ROADS AND STREETS

One of Detroit's two Littleford-Clark-moore heater-planers is pictured working on busy Woodward Avenue. When the Detroit streetcars were replaced by buses, the track area was covered with a dense graded bituminous mix. ABA Asphalt Co., of Birmingham, Michigan, was awarded contract to plane lane adjacent to track area prior to another contractor placing bituminous mix to the edge of the second lane. This was done to eliminate excessive crown in street and feathering of the new pavement at the junction with the existing top. A Terratrac tractor with ¾-yd. bucket was used to remove and load the asphalt into trucks. Second heater-planer followed this unit by a block. (Roads and Streets photo).

Published by Gillette Publishing Company, 22 West Maple Street, Chicago 10, Illinois

FEBRUARY 1957

Pike's Peak overlooks east side of Ute Pass in Colorado.
Motorists travel highway safely, securely on asphalt.

Tourist attraction in Colorado—

Good Roads with STANDARD Asphalt

Motorists want good roads. They like to drive on asphalt. Contractors building roads in Mid-America benefit by specifying STANDARD Asphalt. Here's why:

1 Assured source of supply. Standard Oil has a demonstrated record of deliveries on contract. Contractors know that when they order from Standard, they have an assured source of supply.

2 Convenient source of supply. Tank car and tank truck deliveries are made from five conveniently located Standard Oil refineries.

Wood River, Illinois — Casper, Wyoming
Whiting, Indiana — Neodesha, Kansas
Sugar Creek, Missouri

3 Complete line. Standard Oil makes a full line of paving asphalts. They meet most rigid requirements.

4 Experienced asphalt sales specialists. Standard Oil men who sell asphalt know road construction, know what a contractor's needs and problems are. They know how and what to do to give a builder service on asphalt.

Get more information about the advantages of ordering STANDARD Asphalt. Call any of the 23 Standard Oil offices in the 15 Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY
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STANDARD

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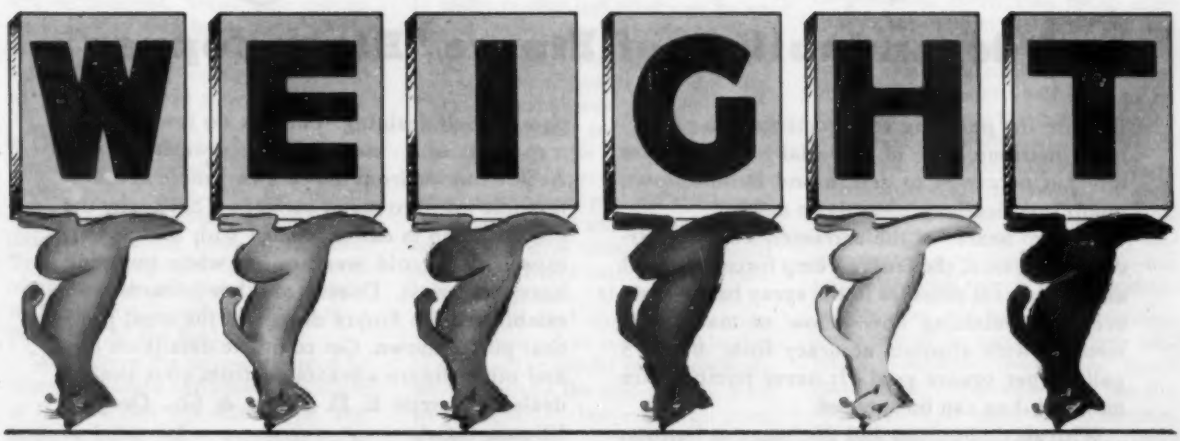
DEPENDABLE

Simplicity Automatic

4000 lbs. to 8000 lbs. . . . BINDER TO TOP? *FLIP ONE SWITCH!*

QUICK as a cat

can wink...



No. 10 | 3/8" | 3/4" | 1 1/4" | DUST | ASPHALT

RIGHT ON THE NOSE!

Simplicity *Automatic* Equipment is available *ONLY* on Simplicity asphalt plants, new or old.

THE SIMPLICITY SYSTEM CO., Chattanooga, Tenn.

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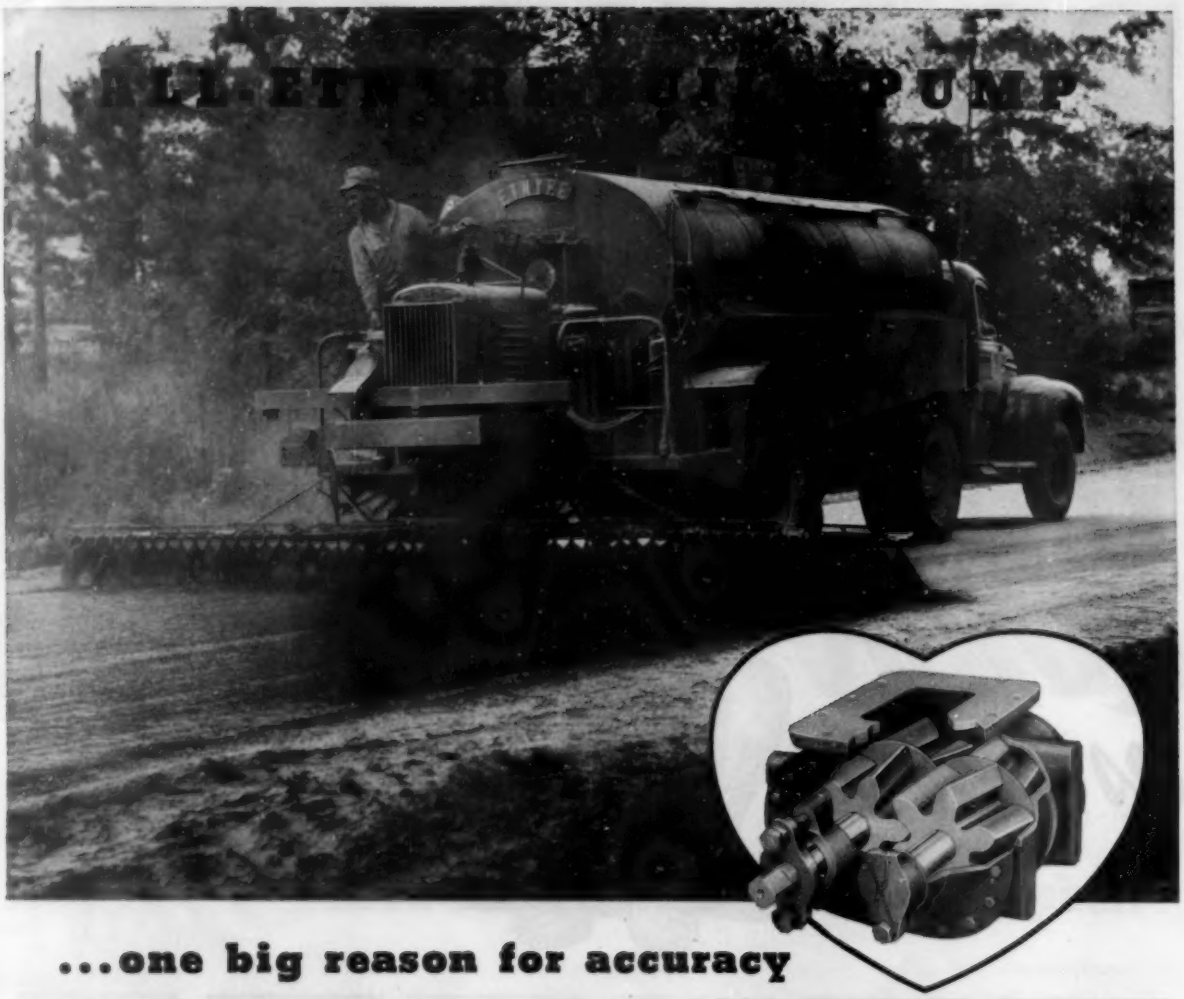


...one big reason for accuracy and dependability of Etnyre "Black-Topper"

Because the pumping requirements of a bituminous distributor are of a special nature, Etnyre found it necessary to design and build its own pump specifically to meet those needs.

As the "heart" of the extremely compact circulating system, the Etnyre Pump forces material under constant pressure to the spray bar with an even, nonpulsating flow. Flow of material is metered with absolute accuracy from .05 to 3 gallons per square yard. It never pumps more material than can be sprayed.

With suction on top and discharge at bottom, pump is self-draining. There is no low point to trap material . . . *material flows straight through!* As you can see from the cutaway, there are least possible metal-to-metal surfaces. That's why the Etnyre Pump is easier to turn with less power, especially in cold weather, or when pumping heavy materials. Dozens of other features have established the Etnyre design as the most practical pump known. Get complete details on this and other Etnyre advantages from your nearby dealer, or write E. D. Etnyre & Co., Oregon, Illinois, U.S.A.

SEE YOUR ETNYRE DEALER

ETNYRE

"Black-Topper"
BITUMINOUS DISTRIBUTORS

. . . for more details circle 265, page 16

VIEWS AND COMMENTS

By H. G. Nevitt

PAVEMENT HARDENING FROM VOLATILE LOSS

Part II. The Problem and Its Solution

OUR previous review of the fundamental source of asphalt hardening in the road can be summarized by the statement that numerous agencies or affects may contribute to this hardening and the results may be complex. In fact, our discussion, lengthy as it may have appeared, was actually the minimum review possible without ignoring or oversimplifying the matter. Much of it would need amplification to present the full picture.

If the scientific situation is so complex, with so many factors involved, is it possible to always avoid pavements which will show premature hardening after proper construction?

We cannot, in advance, test sections of pavement containing the asphalt and aggregate planned for the project and observe them over sufficient years to feel confident the results desired will be obtained. What then can we do in lieu of this, in such fashion as to have practical controls which can be equitably and realistically applied to actual pavement construction?

• One thing is quite evident from our fundamental discussion. The test procedure must utilize both the asphalt and the aggregate together under conditions resembling those on the road. Tests of individual properties of each of these materials does not—at least with present knowledge—lead to a prediction of the field results.

We believe the procedure must be something about as follows. A sample of the mix that will actually be used must be subjected to exposure under the maximum temperature conditions to be expected in service; the exposed sample must be compacted and show approximately the same volume to exposed surface ratio as will be found in the pavement. The exposure period must be such as to correspond to the expected life of the pavement (or at least some practical period) with due allowance for the effects of maximum exposure temperature as compared to the variable and lower average road conditions. On the basis of correlation of such samples and road experience either the sample can be exposed for the necessary test period or a series of such tests at variable periods can be made from which the final condition can be predicted. Probably the exposure temperature should be somewhere in the neighborhood of 140°, certainly not higher than 150°.

Obviously this type of test cannot be used for project construction control. It will simply have to be of a preliminary and exploratory nature, carried on in the very early planning of the job, to give reasonable confidence that the materials finally used, on the basis of such testing, will presumably give satisfactory results. It will be far from what we would like; but today it seems the only safe way to really predict just what can be expected from a specific project.

We recognize that many engineers will strongly object to this thinking. They want rapid tests, separately evaluating the asphalt and aggregate, with acceleration in the hardening gained from higher temperatures, greater aggregate exposure, perhaps the use of some type of light and similar agencies which will give comparative results between different materials in a relatively short time. Unfortunately, results of this kind are very deceptive. The exposure does not resemble that in service; the results correspondingly do not classify the materials by their service qualities but rather by overaccentuation of certain differences which may on the road be negligible or more than overshadowed by greater cohesiveness or other desirable properties.

• This does not mean that we should not thoroughly look into the individual properties of both asphalts and aggregates, hoping eventually to develop tests from which the result of the combined effects in an actual pavement can be predicted. However, any such program must bear the burden of its own proof. Our greatest danger today is excessive restriction of materials on the basis of overemphasis of certain properties, with both unwarranted dimunition of sources and the sacrifice of other desirable properties in many cases.

Such individual tests will have to be different from anything offered today. The oxidation procedure cannot be at high temperatures but must follow some technique such as that proposed by the Shell Laboratories in Holland, with concentrated exposure to oxygen and the resulting effects from both oxidation and diffusion estimated. The evaluation of the asphalt volatiles will also have to be modified from any test in common use today. The temperatures must be lower; thin film exposure—instead of being desirable—must be changed into one where the diffusion phenomenon is in the same relationship to the evaporation as occurs on the road; and acceleration of the effects, if possible, will probably be through using vacuum rather than high temperature.

• Even these tests combined with corresponding tests on the aggregate properties will have to be shown to be susceptible of combination to predict a road result. Furthermore, this road result must be measured by changes in the road properties, or by characteristics from which these changes can be predicted, rather than by an arbitrary interpretation of changes in the materials themselves. A distinction between volatile hardening and abnormal loss of ductility will have to be made. All of these things can be done with sufficient study and understanding of the mechanism of road failure; but arbitrary assumptions as to such road failure on the basis of the individual tests—many of them totally unrepresentative of road conditions—are unsafe and will merely lead us astray.

This does not mean that common sense cannot be used to exclude materials obviously poor from many standpoints, but it does rule out the classification of numerous aggregates or asphalts with, on the whole, good average service records into good and bad on the basis of some highly empirical test or assumptions based thereon.

Coming back to the field exposure simulation test outlined above, we can say that the development of such a procedure will in itself be a tremendous forward step. Even if it does not

(Continued on page 146)

Slides, Floods and Detours Taxed This Contractor's Ingenuity

● GM Detroit Diesel power unit for the asphalt plant—mounted on 2-axle towing trailer.

Difficult valleyside terrain complicated surfacing job on 26-mile relocation at Palisades Dam in Idaho. Contractor's plant site flooded out, but he kept on schedule.

By H. K. Glidden,

Contributing Editor

MANY secondary engineering problems were created by the construction of Palisades Dam, the U. S. Bureau of Reclamation's $76 million project nearing completion on the Snake River in eastern Idaho. One of these was the relocation of U.S. 26. This highway closely followed the Snake River, lying largely in the fertile bottom lands where the 301-ft. dam was to rise forming a 21-mile reservoir. The new highway alignment is north of the reservoir along the mountain's edge in a rugged terrain cut frequently by steep canyons. Its 22 miles include Idaho's largest highway fill (Roads and Streets, December 1954).

The bulk of the $5 million relocation cost went for grading and drainage, awarded in five separate contracts. This article describes the surfacing operations of Holmes Construction Co., of Heyburn, Idaho. which completed a $500,000 paving contract in 1956.

The valley's narrowness at the damsite made it necessary to reroute U.S. 26 around the end of the dam almost as soon as work was started. Because of the steep slope, it wasn't easy to connect the old road to the new. The upstream situation was met during construction by building the so-called Indian Creek detour beginning about five miles above the damsite (see map sketch). This detour took advantage of Indian Creek Canyon to allow an easy grade connecting the new road to the old. However, this location made it necesary for all traffic to use the five-mile section jointly as soon as the dam construction severed the old highway.

The strategy employed by Holmes Construction Co. in keeping the job on schedule took into account all adverse factors while capitalizing on the natural advantages. The advantages included the facilities available from Palisades Contractors, prime dam contractor, at the west end of the project. The dam contractor offered office, bunk, mess and communication facilities. The job was planned so as to utilize old U.S. 26, parallel and adjacent to the relocation, for hauling materials.

The project handicaps consisted of a short working season, remote location of the project, slides, high water, heavy tourist traffic, and a Snake River crossing. The fact that the project extended into Wyoming complicated the licensing of vehicles and compliance with regulations.

● *Job Planning.* The plan adopted called for a single aggregate production plant to be located at the far end of the job (again see sketch). Aggregate production and stockpiling were

● Pioneer crusher set-up at convenient location near east end of project in deep gravel deposit. Cat D8 dozer and Cat D6 equipped with Austin model 6-C overshot loader dozer pushed gravel to hopper over conveyor.

● **Here an Allis-Chalmers HD-21 pushes slide material to a ¾-yd. Koehring 304. The truck wastes material over the closest fill. Reclamation Bureau Jeep shown—agency used them exclusively in this rugged terrain.**

One of the major delays occurred in the spring of 1956, when there was an exceptionally high run-off in the Snake River drainage area. The run-off proved too great to be handled through bypass facilities at the dam as then completed. This resulted in an unplaned storage of water above the dam to such depth that it covered old Highway 26 and reached the site of Holmes' hot-mix plant.

The company had set up a portable Cedarapids hot-mix plant near Indian Creek detour. When flooding was imminent, the equipment was rapidly dismantled and stored on higher ground. When the flood receded, the plant was re-erected at the same location since it was necessary to clean up a large stockpile at this site. In addition to having thus to move the hot-mix plant twice, the contractor was hampered by the fact that all traffic had to use the

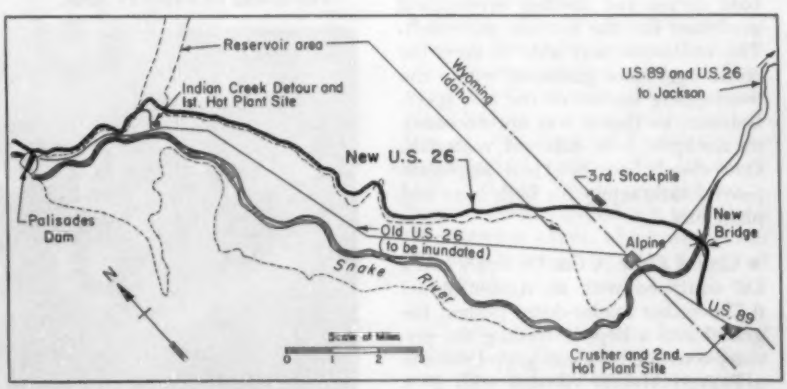
● **Oil-fired Cedarapids hot-mix plant, shown in first location at Indian Creek detour.**

determined to be the critical factors, as the hot-mix plant had to operate to full capacity during the short season.

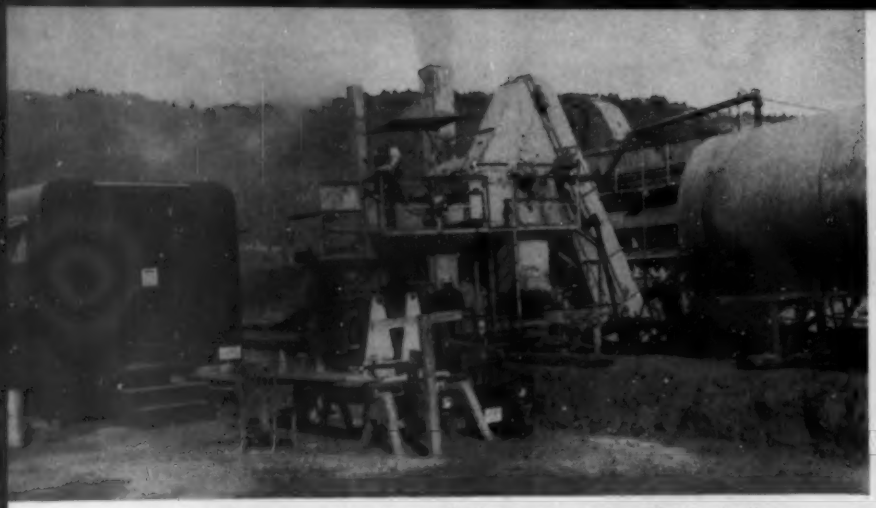
Three stockpile locations were selected. A flat section adjacent to the Indian Creek detour was chosen for stockpiling enough hot-mix aggregate for about the downstream half of the 22-mile project. The second hot-mix aggregate stockpile was selected adjacent to the crusher site.

The third stockpile was along the new alignment about 5 miles west of the crusher across the Snake River. It provided only base course aggregate, and served the purpose of making material available at any time when a Snake River crossing by trucks was impractical.

All of Holmes' key men and most of their labor are full-time employees, recruited from their home neighborhood. The project was worked five 11-hour shifts per week.



● **Showing relocation in relation to new Palisades Dam and old route to be abandoned. Also locations of plants and stockpiles.**



● Field laboratory work at the asphalt plant was done in the trailer seen at the left.

terial going to the storage bin. Oversized material thus removed was fed into a 10 x 36 jaw crusher, and again screened, with the over-size going to a 30 x 18 roll crusher for final crushing.

This plant average 2,200 tons of aggregate per 10-hour a day. The Mesabi vibrator unit included a C882 jaw crusher and was powered by a GM Detroit Diesel Model GRA 1148 engine. The second jaw crusher and roll crusher were powered by a Cat D-13000 diesel. The primary and final conveyors were equipped with Schrock drive using Timken bearings and internal electric motor.

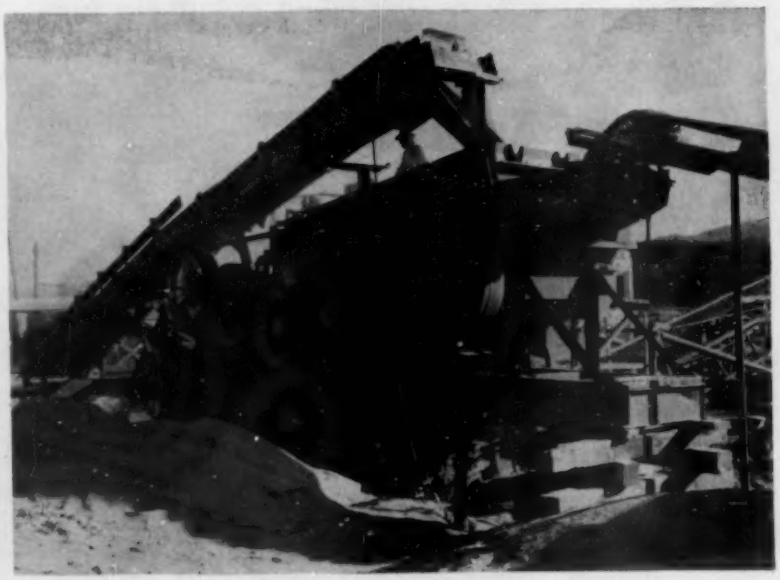
A Cat D318 engine generator unit supplied power for the two conveyors and lights around the crusher. A Ho-

new highway during the flood period.

● *Earth Slides.* Another source of delay was a number of extensive earth slides. These appeared to result from seepage water finding impervious strata in the deep cuts, creating slippage planes. Most slides occurred after grading had been completed. The Bureau of Reclamation policy was to waste the slide material over the edge of the closest convenient fill. Some of the material was handled by contract; the balance by Bureau-owned or rented equipment. One interesting aspect of the Bureau's handling of the slide material was the erection of a section of snow fence at the foot of the slide to prevent rocks and boulders from rolling on the pavement.

Holmes' crushing plant was installed in a large gravel deposit at the eastern end of the project, where it supplied 185,000 tons of aggregate. The Pioneer equipment was so set up as to allow the contractor extremely close control over gradation. This is attested to by the fact that the Bureau's specifications required one gradation for the base course and another overlapping gradation for the hot-mix pavement. The contractor was able to keep the entire aggregate gradation within the overlapping section of the two specifications, so that it was not necessary to stockpile two different materials. One closely controlled aggregate proved satisfactory for both base and plant mix.

● *Gravel Plant.* A Cat D8 dozer and a D6 equipped with an Austin Model 6-C overshot loader-dozer pushed the gravel into a hopper feeding the primary conveyor. Pit-run gravel went to a Pioneer Mesabi vibrator with 20 x 36 jaw crusher. The aggregate then passed over screens, the ¾ minus ma-



● Secondary crushing plant. Recirculating belt overhead at left.

● Another big slide required extensive benching. Allis-Chalmers HD-20 dozer dressed slope, as Cat D98 tractor pulled Cat Lowbowl wasted dirt end-to-end on two-way haul.

● (Left): Graders used exclusively for blading base course. (Right): Tampo pneumatic roller also works on base course prior to priming.

bart 300-amp portable welder was kept available for maintenance and repairs together with a large trailer housing other maintenance equipment.

Five International R-190 dump trucks with 5½-yd. Lang bodies and one International R-160 dump truck with an endgate spreader handled the crusher output. The crusher production was measured at the site by Winslow scales. The Bureau of Reclamation maintained test equipment at the crusher and ran 10 to 12 gradation tests per day.

The output for base course was applied directly to the roadbed or stockpiled in a convenient location.

The 34,000 tons of aggregate required for hot-mix pavement was about evenly stockpiled at the Indian Creek detour site and a site about 100 yards from the crushers. Crusher production was planned well enough so that the crusher was in operation up

● Cat 12 motor grader spreads first of two base course layers. Compaction by Bros 675 pneumatic roller, pulled by Hough loader.

● International R-190 trucks haul 15-ton loads hot-mix to Barber-Greene spreader. In background, Buffalo-Springfield KX25D roller takes on water while waiting for hot-mix to cool down.

to about ten days prior to the completion of the paving, thus eliminating considerable stockpiling and rehandling.

● *Paving.* The project involved 22 miles of 28-ft. wide by 2-in. thick hot-mix wearing surface. Holmes Construction's Cedarapids oil-fired hot-mix plant had an average hourly production of 160 tons. A Barber-Greene paver laid the mix in a 9 ft. center strip and two 9½ ft. outside strips. Specifications required a 4 to 1 slope on pavement edges, which resulted in the outside edges tapering from full 2-in. thickness to zero in a width of 8 in.

The hot-mix plant was first erected adjacent to the aggregate stockpile near the Indian Creek detour. The westerly half was serviced from a location adjacent to the crusher site. The

● Acker model DG core and auger drill, powered by Hercules IXLB-5 engine, bored 20" diameter by 3½ ft. holes for guard rail post, one every 5 to 7 minutes. Rig mounted on Diamond T truck.

● Project required 27,000 lin. ft. of Flexbeam guard rail for the many high fills. Subcontractor McWaters used LeRoi 105 compressor in painting Flexbeam.

entire down time for the plant move was two days.

The electric power for plant operation was supplied by a General Motors 187.5 KVA engine generator plant including a Model I-973 generator driven by a Detroit Diesel engine Model 62500-RA.

The Bureau maintained laboratory testing equipment at the hot plant, and ran continuous tests on the material produced.

The grading, done by prior contract, included compacted subbase (90-95 percent) varying in thickness from 6 to 12 in. Holmes' contract called for placing a 6 in. compacted-thickness base course in two layers, using ¾ in. minus crushed aggregate. Sealcoating will be delayed until August, 1957, as the Idaho state highway engineers want traffic over the road for one year prior to sealcoating.

The road design included bituminous dams, built with hot-mix along the pavement edge on fill areas. Surface water is channeled into corrugated metal embankment protectors.

● *Road Design.* The alignment of the new highway involved an almost continuous succession of horizontal curves having a maximum curvature of 10 degrees. Sight distance is 500 ft. minimum. Since many curves come at locations where there were deep fills or steep natural slopes, the project required 27,000 lin. ft. of guard rail. The contractor installed Armco Flexbeam using 8" x 8" x 6' creosoted posts.

The Holmes Construction Co. is a family affair, consisting of the father (and boss) Del Holmes, and four sons, Don, Keith, Harold and Ralph. This company has grown rapidly in its ten years of existence. The father and four sons were all active on this project.

While the relocation of U.S. 26 was accomplished with Bureau of Reclamation funds and personnel, it was carried out in cooperation with the Idaho and Wyoming state highway departments. Louis Ackerman, the Bureau's resident engineer until shortly before completion of the project, was transferred to the Trinity River Project in California. H. P. O'Donnel, former field engineer, succeeded in charge of the entire Palisades project.

Asphalt Institute Leaders Elected for 1957.

● First and second vice presidents of the Asphalt Institute, by geographical divisions, were elected at the Institute's recent New York board meeting. (*Seated*): C. Wayne Barbour, president of Allied Materials Corp., Oklahoma City; T. F. McGarey, Cities Service Oil Co., N.Y.; and C. V. Kiefer, Shell Oil Co., San Francisco. (*Standing*): J. M. Lackey, Malco Refineries, Inc., Roswell, N.M.; Phil C. Doyle, Standard Oil Co. of Ohio, Cleveland; Frank E. Widger, The Texas Co., Chicago; G. L. Farnsworth, Husky Oil Co., Cody, Wyo.; D. Hugh Jenks, Jr., Ashland Oil & Refining Co., Ashland, Ky.; and Edward J. Barnes, Mcmillan Petroleum Corp., Los Angeles.

Four more improvements in the Barber-Greene Finisher

Four new improvements give the Barber-Greene Finisher faster speed, faster travel, lower maintenance cost and increased power.

Improving the Barber-Greene Finisher is not something new. Scores of major improvements have been embodied in its design since it was first released to the field 20 years ago.

These improvements have been incorporated without spectacular announcements or fanfare. They have all been based on vast experience. In fact, the Barber-Greene Finisher is now paving its second million miles, which is many times the mileage and tonnage records of all other asphalt paving machines in the world combined.

These are all proven, sound improvements developed from experiences in laying every type of mix, in virtually all conditions. Machines embodying this group of design changes are now in production and are designated as the Model 879-B.

Latest improvements include:

NEW TRANSMISSION—Provides both higher operating and travel speeds. The new transmission still provides 12 forward speeds giving a wider range of operation.

HIGHER SPEED TAMPER—This new design permits faster laying speeds and reduces maintenance costs.

NEW CRAWLERS—Precision-drilled pads and larger pins will further decrease maintenance costs.

NEW POWER UNIT—20% more power. This means pushing even bigger trucks, handling even steeper grades, greater reserve for high altitude, and higher speeds of operation.

Note To Barber-Greene Finisher Owners

These latest improvements, as well as many previous improvements, can be incorporated in your old machine. Necessary parts are now made up in kit form for each modification separately. A folder describing the various kits is available.

57-3-F

Barber-Greene BG

AURORA, ILLINOIS, U.S.A.

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

. . . for more details circle 259, page 16

PAVEMENT HARDENING

(Continued from page 139)

give the quick rating of materials everyone desires, it will tell a great deal more about those we are now using and how to control them. What is presently needed is an immediate program of initiating such tests on new projects, or on ones where the original materials are obtainable, in order to establish the necessary correlation between field and laboratory results.

Finally, the distinction between construction hardening and pavement hardening must be thoroughly understood. The two have little relation, and steps to limit both in one fell swoop are simply going to delay the proper control of each.

• Basically, the problem of hardening is not too difficult, even if it is somewhat complex, as we trust our discussions on this whole subject have brought out. Intelligent but simple steps can be taken to develop tests which will throw a great deal of light on it and lead to a considerable degree of control. The rest of the story will be told by the volume of work done, provided it is well planned and objectively analyzed. In brief, here is a place for the highway engineer to use his basic technology in order to assure himself of maximum life in his pavements. Generally speaking, the record in this respect is excellent; but the test of good engineers is the elimination of practically all inferior work rather than merely showing up with a fairly good percentage of successes. The failures represent losses; our job is to stop these.

Test sections of asphalt runways planned

Construction is expected to start soon on eighteen pilot sections of airfield paving, according to an announcement of the National Bituminous Concrete Association. Plans for this investigation, to test the role which asphaltic concrete paving can play in modern military airfield construction, were worked out at a joint meeting between the Corps of Engineers and the Asphalt Institute.

Accelerated load tests will begin on two sections as funds become available to construct and operate the sections. Two paving will be built with mix designs recommended by the Asphalt Institute. The design provides for 3 in. of binder course and 1 in. surface course, using 85-100 penetration asphalt cement. Asphalt content will be varied between the two mixes but aggregate gradation will be same.

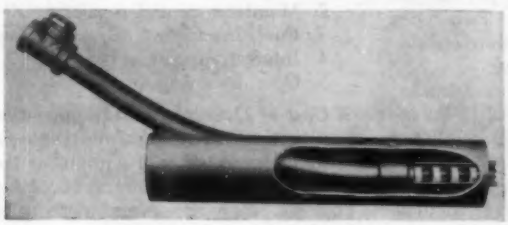
Electric Heating Data Obtained for 2-ton Asphalt Plant

ELECTRIC heating devices have been specifically engineered for the various elements of hot-mix asphalt plants. One maker of such devices, for example, manufactures electric heaters for asphalt storage tanks, pipeline tracing, metering devices and weigh buckets, pug mills, and drier fuel-oil systems. Electric heating plays a part in modernization of existing plants and as original equipment for new plants. Plant operators today are considering the possible advantages of this form of heating in relation to steam or direct-fired systems.

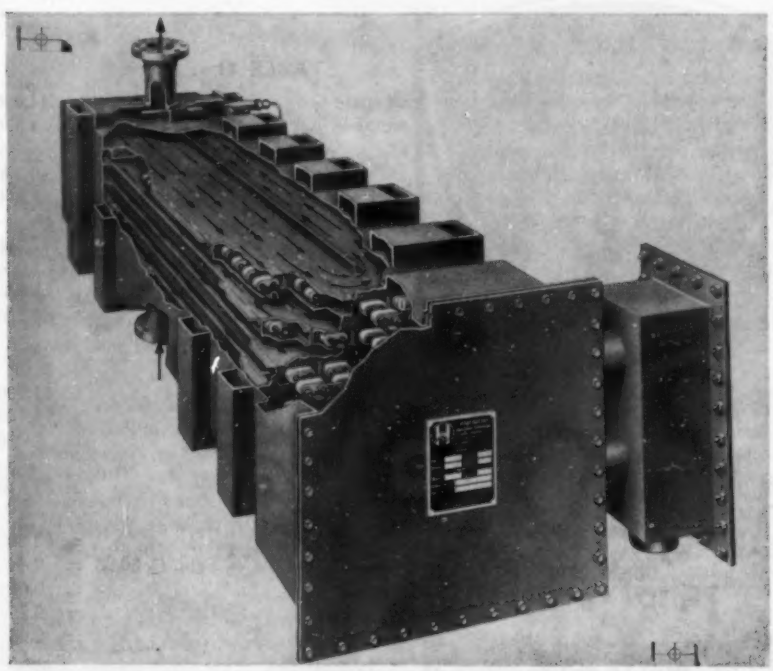
The more obvious advantages of electric heating claimed by manufacturers are increased safety with the elimination of explosion or fire hazards, prevention of overheating with its resultant coking, totally automatic operation, simplicity of installation, neatness, and cleanliness.

It is also indicated by a recent test that such heaters are in some instances cheaper to buy, install, operate and maintain. One manufacturer, Hynes Electric Heating Division, Turbine Equipment Co., reports cost data of interest. In cooperation with local electric utilities, the power consumption of several independently operated plants was recorded over extended periods. The cost of electrically heating a typical two-ton asphalt plant was $7.98 for 24 hours of operation. This was a maximum cost under adverse load and demand conditions. This figure was almost halved to $4.38, with the installation of timing controls permitting heating at night when the demand was low, eliminating extra charges for electricity. Tests showed that the asphalt temperature dropped only 20° during the day and the hot asphalt maintained the temperature of the jacketed equipment within specified limits.

The plant which yielded these data consisted of two 10,000 gal. asphalt storage tanks, each with a 40 KW two-stage Hynes electric heater, one 30 KW hot oil heat transfer system, and 50 ft. of pipeline tracing. With two-stage electric control for storage tanks, only one stage or one-half the installed kilowatt rating is used for maintaining temperatures, with the second stage available if needed for heating up cold tanks.



● **Electric inner pipeline tracing, used in test to keep asphalt at correct temperatures from storage tank to the weigh bucket or metering device without danger of coking. All the heat goes directly to the asphalt.**



● **The Hynes electric multi-pass heater employed in the test with indicated cost advantage as well as eliminating danger of explosion, fire, heat losses and overheating.**

Tachometer used on stone spreader

A tachometer has been used on a spreader box successfully to help regulate the spread of cover stone for surface treatment work, according to a report in "Texas Highways". The Austin District is the scene of this innovation, described in the employee publication of The Texas Highway Department by W. K. Schultz, Senior Resident Engineer.

A complete tachometer was removed from an idle distributor and attached without alteration to a spreader box. The dial of the meter was located near the line of sight of the truck driver, as he watched the edge of the fresh asphalt or guide line. He was thus able to see at a glance that his speed was the speed desired, and was thus enabled to keep his speed steady.

Initially several runs are required, according to Mr. Schultz, before a desired rate of application could be achieved with full accuracy. After the proper combination of speed of truck and spreader box notch was worked out, the results obtained from measured quantites of cover stone over staked rock lands are as accurate and consistently uniform as the results obtained for the asphalt distributor.

New members added to bituminous concrete group

Twenty-two new member companies have been added to the National Bituminous Concrete Association, according to a recent announcement from its executive secretary, H. K. Griffith, Executive Secretary, with offices in Washington, D. C. A goal of 500 member producing companies was given as a goal by the end of 1956.

What Size Unit to Haul Materials?

A cost comparison made for an actual project shows the important savings possible through careful analysis and making the right choice of equipment.

By R. L. Peurifoy

Professor of Construction Engineering
Texas A & M College, College Station, Texas

WHEN it is necessary to haul a large quantity of sand, gravel, crushed stone or earth for a construction project or for other uses, it is desirable to analyze the cost of hauling, using several different sizes of units, to determine which size will give the most economical results. Frequently the difference in cost resulting from the size selected is surprisingly great. This article is intended to demonstrate a method of analyzing hauling costs in order to select the most economical equipment.

The project for which this study was made required the hauling of approximately 75,000 cu. yd. of crushed sandstone rock, which was used as a subbase for an asphalt highway. The aggregate was produced at a quarry which was located adjacent to a paved highway. It was hauled an average distance of 26 miles, all on a paved highway with light traffic. The output of the crushing plant averaged approximately 200 cu. yd. per hour. The aggregate weighed 2,600 lb. per cu. yd.

Equipment Considered. Two types and sizes of hauling units were considered. They were as follows:

Plan 1. Use 5-cu.-yd. dump trucks, 2-ton rated capacity, with 155 horsepower gasoline engines, with dual rear wheels, and 9.00 x 20, 10-ply tires.

Plan 2. Use 3-ton trucks, with 195 horsepower gasoline engines, with dual rear wheels, and 9.00 x 20, 10-ply tires, pulling 10 cu. yd., struck capacity, cable-dump trailers, with dual 9.00 x 20, 10-ply tires, to haul actual pay loads of 11 cu. yd. per load.

The condition of the haul road and the freedom from traffic delays would permit average speeds of 40 mph loaded and 45 mph empty. It was assumed that the units would be operated 1,600 hours per year. This assumption, of course, is subject to variations, depending on the types of projects for which it is used, the locations of the projects, and the manner of shifts operated per day.

Cost of Owning and Operating Equipment. The cost of owning and operating equipment of this type will include the following items:

1. Depreciation
2. Maintenance and repairs
3. Fuel, lubricating oil, and grease
4. Interest, taxes, and insurance
5. Operator's wages

• *Cost of Depreciation.* Depreciation is a cost which results from the continuing loss in value of equipment because of its wearing out and becoming obsolete. There are several methods of

TABLE I

Cost of truck with dump bed and spare tire	= $4,350
Deduct the cost of 7 tires @ $150.00	= 1,050
Cost of truck less tires	= $3,300
Assumed salvage value	= 500
Total cost of depreciation	= $2,800
Assume a useful life of 4 years, at 1,600 hr. per year	
The annual cost will be	
Depreciation, $2,800/4 yr.	= $ 700
Repairs, 15% of $3,300	= 495
Interest, insurance, taxes, 10% of $4,350	= 435
Total annual fixed cost	= $1,630
The cost per hour will be	
Fixed cost, $1,630/1,600 hr.	= $1.02
Fuel, 0.5 x 155 hp. x 0.1 gal. = 7.75 gal. @ $0.25	= 1.94
Oil and grease, 25% x $1.94	= 0.48
Tires, $1,050/800 hr.	= 1.31
Operator	= 2.25
Total cost per hour	= $7.00

The cost of owning and operating truck and cable-dump trailers under Plan 2 will be as in Table II.

TABLE II

Cost of truck with spare tire	= $4,990
Cost of trailer, complete	= 4,570
Total cost	= $9,560
Deduct the cost of 12 tires @ $150.00	= 1,800
Cost less tires	= $7,760
Assumed salvage value	= 1,000
Total cost of depreciation	= $6,760
Assume a useful life of 4 years at 1,600 hr. per year	
The annual cost will be	
Depreciation, $6,760/4 yr.	= $1,690
Repairs, 15% of $7,760	= 1,164
Interest, insurance, taxes, 10% of $9,560	= 956
Total annual fixed cost	= $3,810
The cost per hour will be	
Fixed cost, $3,810/1,600 hr.	= $2.38
Fuel, 0.5 x 195 hp. x 0.1 gal. = 9.75 gal. @ $0.25	= 2.44
Oil and grease, 25% of $2.44	= 0.61
Tires, $1,800/800 hr.	= 2.25
Operator	= 2.25
Total cost per hour	= $9.93

estimating the cost of depreciation. The simplest and most satisfactory for use with trucks is the straight-line method. Under this method it is assumed that the value of a truck will decrease with use at a uniform rate per unit of time, such as a year, month, week or hour, until the truck is disposed of. Usually some net salvage value will result from the disposition of a truck. Since the useful life of the tires will be different from that of the truck, the cost of depreciation for the tires should be determined separately. As an example, consider a truck whose total cost is $5,000. If the tires and tubes cost $900, the net cost of the truck without tires will be $4,100. Assume the truck will have a useful life of 4 years, at 1,600 hours per year, and that the tires will have a useful life of 800 hours, or one-half year. At an average speed of 30 mph this is equivalent to a life of approximately 25,000 miles. Assume the truck will have a salvage value of $500 after 4 years.

Using the straight-line method the cost of depreciation will be determined as follows:

Cost of truck and tires	=	$5,000
Deduct the cost of tires	=	900
Cost of truck less tires	=	$4,100
Salvage value of truck	=	500
Total cost of depreciation	=	$3,600
Cost of depreciation per year		
Truck only, $3,600/4 years	=	$ 900
Tires, 2 sets at $900	=	1,800
Total cost	=	$2,700
Cost per hour, $2,700/1,600 hr.	=	$1.69

Cost of Maintenance and Repairs. The cost of maintenance and repairs includes the cost of parts and labor required to keep a truck operating during its useful life. While this cost will vary a great deal with the care it receives and the conditions under which it is used, information available indicates an average annual cost equal to 15 per cent of the original cost of a truck.

Fuel, Lubricating Oil and Grease. The amount of gasoline required to operate a truck engine should be about 0.08 to 0.10 gal. per hour for each horsepower demand on the engine. Since the engine usually will not operate at maximum power except for short periods of time, the full power of the engine should not be used to determine the amount of fuel required. As a truck will haul loaded one way and return empty, with some lost time at each end, an assumption that the engine will operate at 50 percent of full power should be reasonable. Thus the actual consumption of gasoline should be about 0.5 x 0.1 = 0.05 gal. per rated horsepower-hour.

The cost of oil, filters, and grease should be about 25 per cent of the cost of fuel during the life of a truck.

Interest, Insurance, and Taxes. The cost of interest, insurance and taxes will vary with location and the purpose for which the equipment is used. The average cost per year should be about 10 per cent of the original cost of a truck.

• *Hourly Costs Compared.* The cost of owning and operating dump trucks for Plan 1 will be as shown in Table I.

Cost of Hauling with Dump Trucks. Determine the quantity of material hauled per hour by one truck. The total time for a round trip should be about as in Table III.

Cost of Hauling with Trucks and Trailers. Determine the quantity of material hauled per hour by one truck and trailer. The total time for a round trip should be about as in Table IV.

TABLE III

Loading time, 5 cu. yd./200 cu. yd. per hr.	= 0.025 hr.
Hauling time, loaded, 26 miles/40 mph	= 0.650 hr.
Dumping time, 4 minutes	= 0.067 hr.
Returning time, 26 miles/45mph	= 0.578 hr.
Add for lost time, 6 minutes	= 0.100 hr.
Total time	= 1.420 hr.

Assume an actual operating time of 50 minutes per hour.

Number of trips per hour, $\frac{1}{1.42} \times \frac{50}{60} = 0.585$

Quantity hauled per hour, 0.585 x 5 = 2.92 cu. yd.

Cost per cu. yd., $7.00/2.92 = $2.39

The total number of trucks required will be 200 cu. yd. per hr./2.92 cu. yd. per truck = 69

Total investment in trucks, 69 x $4,350 = $300,000

TABLE IV

Loading time, 11 cu. yd./200 cu. yd. per hr.	= 0.055 hr.
Hauling time, loaded, 26 miles/40 mph	= 0.650 hr.
Dumping time, 6 minutes	= 0.100 hr.
Returning time, 26 miles/45 mph	= 0.578 hr.
Add for lost time, 8 minutes	= 0.133 hr.
Total time	= 1.516 hr.

Assume an actual operating time of 50 minutes per hour.

Number of trips per hour, $\frac{1}{1.516} \times \frac{50}{60} = 0.55$

Quantity hauled per hour, 0.55 x 11 = 6.05 cu. yd.

Cost per cu. yd., $9.93 ÷ 6.05 = $1.64

The total number of units required will be 200 cu. yd. per hr./6.05 cu. yd. per truck = 33

Total investment in equipment, 33 x $9,560 = $315,000

TABLE V

Large Trailer Dump Saving on Long Hauls

Equipment used	No. of units	Total investment	Cost per cu yd	Total cost	Saving in cost
Dump trucks	69	$300,000	$2.39	$179,000	
Trucks and trailers	33	315,000	1.64	123,000	$56,000

• *Conclusions.* Table V summarizes the results of the analysis.

The use of trucks and cable-dump trailers will simplify loading and dumping operations because of the smaller number of units required, and will produce a saving of $56,000. This saving is sufficient to justify the expenditure of considerable time in analyzing the cost of hauling using various sizes and types of hauling units.

While only two sizes of units were considered in this article, there are other sizes which also should be considered before the final selection is made.

Stabilizing shoulders with emulsified asphalt

To cut maintenance and provide greater safety the Oregon state highway department is using a new procedure for stabilizing shoulders. In place of removing the existing shoulder material and putting in a new oil mat, the material is treated with a mixing grade of emulsified asphalt, followed by an emulsion seal. The result is a satisfactory shoulder at lower cost.

As described in Western Construction, the relatively new procedure stabilizes the existing material at a saving of as much as $1,500 per mile, compared to replacing it with a stabilized oil mat. An SS-1 (mixing grade) asphalt emulsion was selected because of its ability to mix readily with west aggregates, plus its ease of handling.

Steps in the procedure were adjusted to meet varying conditions, but usually began by sprinkling the shoulder with water to hold the fines. Next step was to grade the material away from the pavement to a depth of about 1 in. Emulsified asphalt was then added in several shots, sometimes diluted with about 50 percent of water. The water helped disperse the emulsion.

The applications continued until about from 0.65 to 0.80 gal. per sq. yd. of emulsion had been blended in. It was aided in dispersal by occasional blading. Then, the finish grader was equipped with a layout "boot" designed to give a straight shoulder line to the surface. It made the final layout pass, followed with a steel-wheel roller. A final light shot of mixing grade emulsion was applied and the surface covered with coarse sand.

Curing for 7 to 10 days was allowed before the final seal consisting 0.25 gal. of RS-2 quick-breaking emulsion covered with ¼-in. to No. 10 oil aggregate. The final seal was drag-broomed. The two types of seal aggregate used established excellent demarkation of the shoulder from traffic lane.

After the procedure and to standardize procedure, maintenance crews were able to stabilize about 1¾ miles of 8-ft. shoulders per day. Average cost for stabilization with emulsions was about $2,000 for the two 8-ft. shoulders per mile. This compared to about $3,500 per mile for conventional oil mat construction.

"Slick, Hot Oil"; contractor blamed for accident

Between San Angelo and Carlsbad, Texas, hot oil had been applied to the highway, followed by a heavy rain storm.

Coming into contact with this slick surface an automobile skidded, went into a spin and collided with a truck. No warning sign had told of that oil.

Judgment for $17,083 against the road contractor for the injuries suffered by the automobile driver was sustained by the Texas appellate court with the comment,

"It cannot be disputed that the work done under the contract rendered the highway dangerous for travel unless proper warnings were given. It is customary when hot oil is applied to construction to erect a sign similar to 'Slick—Hot Oil.' Failure to erect the sign could properly be considered as evidence of negligence."

John F. Buckner & Sons v. Allen, 289 S.W.2d 389, Texas, February 22, 1956

NEW ONTARIO DISTRIBUTOR FOR EUCLID. Blackwood Hodge Equipment, Ltd., 10 Suntract Road, Toronto, Ont., for Innes Equipment, Ltd., has been appointed dealer in the Province of Ontario, for the complete line of earthmoving equipment of Euclid Division, General Motors Corporation, Cleveland, O.

"Our most useful trailer is a Dorsey!"

After five years service, this Dorsey MTS is still kept busiest in the Ray Construction Company (Pensacola, Fla.) fleet because it still operates better, with less maintenance. So reports Bill Ray, Jr., at the scene of the job where his company put in sand-clay base for 26 acres of pavement at Pensacola's new multi-million-dollar shopping center, Town and Country Plaza.

For every tough job, there's a tougher Dorsey

MODEL HTS

20 Ton capacity — Weighs Only 8,250 pounds (also available in 15, 25, 30 and 35 ton capacities)

Although as much as a ton lighter than other trailers of comparable capacity, high-tensile steel main channels and close-spaced all-welded cross members give the HTS superior strength and ruggedness. Flat gooseneck provides support for blades and other loads.

THE GIANT PLATFORM

44,000 capacity—Weight: 8,410 lbs.

In the year since its introduction, the Giant has become America's No. 1 platform! Although as much as 2,000 lbs. lighter than other platforms, it has even greater strength.

TANDEM TILT-TO-LOAD

15,000 and 20,000 lb. capacities
Weights: 2,500 and 2,700 lbs.

Speed and efficiency as well as economy are combined in this versatile tilt model: it's so light a dump truck pulls it easily. Two-way hydraulic control is so precisely balanced the weight of a man will tilt it up or down. Single axle models also available.

NEW SELF LOADING FLOAT

This trailer will actually carry 45,000 pounds **concentrated in 10 feet of its length!** The secret is the extra-deep high-tensile steel main frame that we "tailor" to length and load requirements.

DORSEY

For the complete facts on any model heavy-duty trailer, see your Dorsey Distributor or wire collect—

DORSEY TRAILERS / ELBA, ALABAMA

. . . for more details circle 308, page 16

What's New
in Equipment and Materials

Reader Service Coupon on Page 16.

TerraTrac 800 crawler tractor with 1½ cu. yd. bucket has "knockout action" that turns the bucket completely with open side down and bumps bucket to knock out sticky material.

New Crawler Tractors With Attachments Shown Press Preview

Three new engineering advancements in Case-TerraTrac crawler tractor design were demonstrated at a special "preview showing" for trade and business paper editors at the Churubusco, Indiana, works of the J. I. Case Company on December 10. The new developments referred to technically as counter-rotation, torsion bar suspension, and centralized lubrication, are incorporated in two new heavy-duty crawlers in the 80 and 100 gross horsepower class, which was introduced to the construction field.

Most dramatic advancement, from an operator's viewpoint, is the new counter-rotating feature of TerraTrac's hydraulic transmission which provides complete independent power control of each track both as to speed and direction. If the tractor operator gets into a tight spot and wants to turn around in his own tracks he simply moves two hydraulic valve levers on the steering column, and the machine makes a 360-degree spin-turn with one track driving forward and the other in reverse.

If space is no problem, the operator can make smooth power turns by driving one track faster than the other in the same direction. Or, if he wants to pivot-turn, he just touches one of two hydraulic brake pedals, which automatically disengages the clutch and locks the track on that side. The operator thus has three steering options, with both hand and foot controls, for every job condition.

This new 3-way hydraulic steering feature, combined with a new power-shifting transmission and torque-converter drive, give the new 80 and 100-hp Case-TerraTrac crawlers a combination of power, speed and ease of maneuverability. Both machines have four speeds forward up to 6.00 mph, plus four reverse speeds to 7.00 mph. In addition, the constant-mesh TerraMatic transmision enables the operator to change speeds or direction instantaneously "on-the-go" without touching a master clutch or stopping to shift gears. All machine movements are controlled by four hydraulic clutch levers, a manual speed-range selector, foot accelerator, and two hydraulic foot brakes.

These new larger-capacity Case-TerraTrac units are equipped with a Borg-Warner torque converter drive. The 80-hp Model 800 is reported to develop in excess of 20,000 lb. of drawbar pull or push, under ideal tractive conditions, whereas the 100-hp Model 1000 is claimed to be capable of producing a maximum pull of 24,000 lb.

The torsion bar track suspension makes it possible for each track to oscillate freely over irregularities in the ground surface. One track can be run onto an obstacle 12 in. high and the other track will remain flat on the ground with the loader bucket or dozer blade remaining perfectly level.

TerraTrac engineers have also devised a two-point centralized system for lubricating the lower track wheels on the new crawlers. This is accomplished by means of two completely sealed 8-qt. capacity reservoirs (one on each side), extending the full length of the track frame. Each reservoir has individual feed-passages to the track wheels, so that there is always a constant "head" of semi-fluid grease on each wheel.

These new crawler tractors are available with a line of matching equipment, including 1½ and 2-cu. yd. tractor-shovels, an angling dozer blade that can be angled hydraulically from the operator's seat, a straight bull-dozer that tips fore and aft and also tilts for ditching and crowning work.

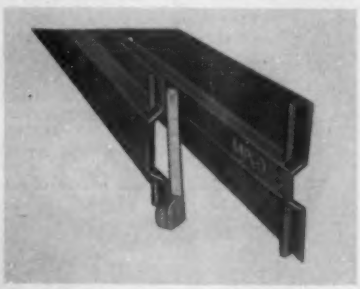
For more information circle 107 on Service Coupon Page 16 and mail now.

Airport Tongue-and-Groove Joint

A new tongue and groove joint designed especially for airport use has been announced by the Presstite-Keystone Engineering Products Co., 101 E. Ontario St., Chicago 11, Ill.

Under the trade name of Kapco, the new joint will have the same general characteristics as the standard size non-metallic key pioneered by the company. The dimensions, however, will differ. Since this type joint will be used primarily for airport construction, or where the slab ranges from 14-in. to 20-in. in depth, it has a larger key: 1¼-in. deep, 4½-in. wide at the base and 3⅝-in. wide at the top.

Construction of the joint consists of strips of mastic board about ¾-in. thick, with outside liners of asphalt saturated heavy kraft. The product is preformed so as to provide a tongue and groove design of maximum efficiency, and so composed as to minimize concrete spalling at joint edges. The joint material is pre-punched to accomodate steel dowels and stake pins.



Kapco Airport Joint

For more information circle 108 on Service Coupon Page 16 and mail now.

Rotary Brush Cutter-Chipper

A new rotary brush cutter and chipper was introduced at the ARBA Road Show by Dotmar Industries, Inc., 502 Hanselman Bld., Kalamazoo, Mich.

This unit is designed for mounting on any small tractor and is powered through the power take-off by a shaft to the gear box on the rotary cutter. This gear box is of the automotive differential type and is very rugged. Easily replaced shear pin is ahead of gear box.

The specially designed cutter blade revolves at high speed and will cut off brush and saplings up to 2-in. dia. Blade has offsets with additional chipper blades bolted on which chop up brush into short pieces after cutting them down. Rotary

(Continued on page 154)

Dotmar Rota-Kut Rotary Brush Cutter

cutter is safety shielded so stones and sticks cannot fly up and hit operator. Unit slides on runners, adjustable for height, and cuts within ½-in. of ground, if desired. Unit is raised off ground for road travel.

For more information circle 109 on Service Coupon Page 16 and mail now.

Portable Aggregate Plant

A new portable aggregate plant, Heltzel Type 200 Batchmaster, designed especially for highway contractors, announced by Heltzel Steel Form & Iron Co., Warren, O., is stated to give large capacity (to 200 plus tons), with high speed twin aggregate batchers for batch-truck batching and up to 8-yd. batchers for truck mixer batching.

Heltzel Type 200 Batchmaster

The Type 200 has smaller counterpart in the Type 100 Batchmaster that has a capacity of 100 tons. Both these plants are designed to go up fast, dismantle easily into sections that can be transported over existing highways without special permits. Both can carry the Heltzel 8-yd. batcher.

For more information circle 110 on Service Coupon Page 16 and mail now.

Truck Mixers

A new series of T.E.D. (truck Engine Drive) Transcrete truck mixers has been added to the line of Construction Machinery Co., Waterloo, Ia. The new mixers are available in 5-7- cu. yd. capacities.

Features of the new series include: Floating drive—job-proven—time-tested on the conventional Transcrete Mixer—is also featured on the T.E.D. Transcrete. The floating drive characteristics protect drum drive from damaging loads inherent in truck mixer operation. It automatically compensates for the reaction of the loaded drums and flexing or abnormal movement of the truck frame.

A power connector using multiple V-sheaves with five long life, steel core V-belts further maintains CMC's policy of flexibility in design. Belts are readily available when replacements are needed.

Large diameter drive shaft tubing contained in flexible mounted center bearing eliminates shaft vibration. Standard Off-The Shelf automotive parts are used in the shaft assembly to further add to the reliability and low maintenance cost in the T.E.D. mixer.

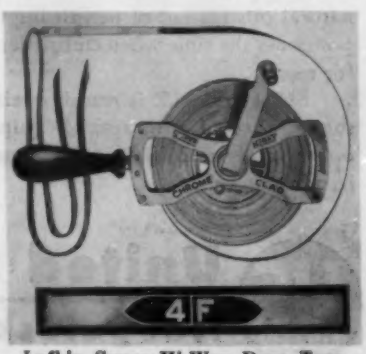
T.E.D. Transcrete Truck Mixer

For more information circle 111 on Service Coupon Page 16 and mail now.

Hi-Way Drag Tape

A new Lufkin Super Hi-Way drag tape was exhibited at the ARBA Road Show by The Lufkin Rule Co., Saginaw, Mich. The tape has the genuine Lufkin chrome clad finish, which is a series of metal electroplatings over a steel line 5/16-in. wide. The final plating is a non-glaring gray-white chrome finish that will not chip, crack or peel.

Another feature of this tape is the raised markings and the raised protective edges around the markings. These raised portions reinforce the tape at the point of the markings and guarantee that the markings will outlast the rest of the tape. All markings are a chrome white with a jet black background making them highly legible and easy-to-read. The Chrome Clad Super Hi-Way tapes are furnished with all standard marking styles in 100, 200, and 300-ft. lengths.



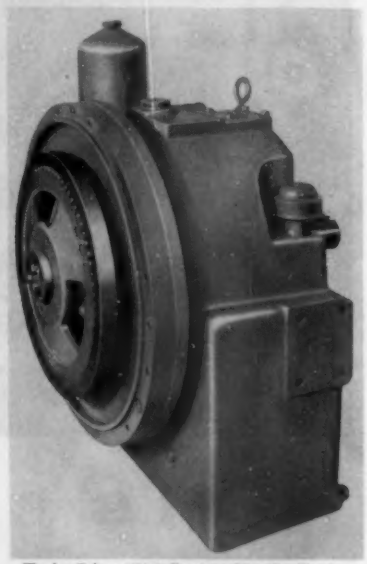
Lufkin Super Hi-Way Drag Tape

For more information circle 112 on Service Coupon Page 16 and mail now.

Torque Converter

A new 1500 series single-stage torque converter was exhibited by Twin Disc Clutch Co., Racine, Wis., at the ARBA Road Show. This unit is designed for shovels, front-end loaders, bucket loaders, industrial lift trucks and other applications where single-stage characteristics offer certain advantages.

This new single-stage addition to the Twin-Disc line is applicable to engines producing from 30 h.p. at 1100 rpm to 207 h.p. at 2500 rpm. Impellers are available for specific torque ratings of 165, 200, 240, 285 and 330 lb.-ft. It is currently available with clutch input, spider drive input, flange input and output, and as a spacer-type unit with double-ended SAE housings.



Twin Disc 1500 Series Single-Stage Torque Converter.

For more information circle 113 on Service Coupon Page 16 and mail now.

Rock Drilling Crawler

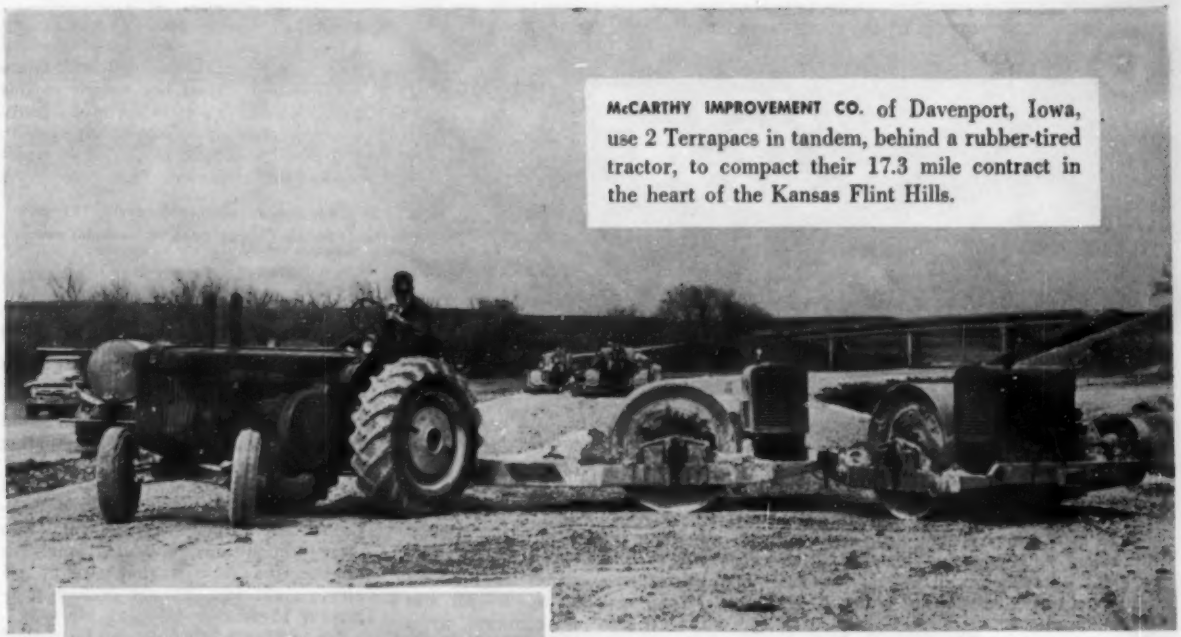
A new rock drilling crawler, announced by Thor Power Tool Co., Aurora, Ill., is entirely self-propelled with drill, mast and air power mounted for one-man operation.

The air-operated crawlers are stated to enable the rig to move over the roughest terrain and to eliminate the need for labor crews to move the drills into position.

The new machine the MM-2 "Drillcat" drifter rock drill and the BW-2 wagon drill mast mounted on the crawlers is equipped with twin, reversible 7½ h.p. air motors. For added maneuverability and ease of operation, the rig also has a hydraulic boom to raise or lower the drilling mast with little effort on the part of the operator.

The "Drillcat" performs the same vertical, horizontal and angle rock drilling operations as the Thor wagon drill. The

(Continued on page 156)



McCARTHY IMPROVEMENT CO. of Davenport, Iowa, use 2 Terrapacs in tandem, behind a rubber-tired tractor, to compact their 17.3 mile contract in the heart of the Kansas Flint Hills.

BROCE CONSTRUCTION CO. of Dodge City, Kansas, also uses a light, wheel tractor to pull their Terrapac when compacting their 19 mile contract on the Turnpike in the vicinity of Emporia.

We're Proud of

TERRAPAC

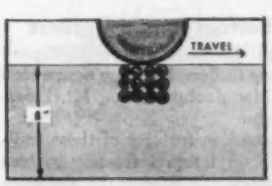
Performance on the Kansas Turnpike!

Compaction specifications were tough on the Kansas Turnpike but, when contractors used Terrapacs to compact the 8" crushed rock base course, the tough specs were met with speed and economy! . . . Terrapac's vibratory compaction permits laying of the entire base course before compaction begins. . . . In a few rapid passes, the 3½ ton Terrapac, pulled by a light tractor, can then compact the entire course to specifications. . . . This method has been approved and used on major turnpikes and tollroads in all parts of the country. . . . ***Ask your dealer for a demonstration.***

VIBRO PLUS

VIBRATORY ROLLERS

BEAT THE SPECS!

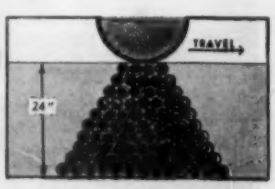


CONVENTIONAL STATIC COMPACTION

Rollers relying on weight alone produce friction forces between soil particles that prevent densification at any great depth.

TERRAPAC DYNAMIC COMPACTION

Vibratory forces, transmitted to soil in all directions, reduces friction—facilitates relocation of particles at greater depths.



VIBRO PLUS PRODUCTS, INCORPORATED • STANHOPE, NEW JERSEY

. . . for more details circle 312, page 16

MM-2 "Drillcat"

crawler's extra heavy weight of 3,000-lb. lends added stability under all operating conditions. Its motors have sufficient extra power to tug compressors into drilling position also.

The new rig is 6-ft. 9-in. long and 6-ft. wide. Boom length is 3-ft. 8-in. It weighs 3000 lb.

For more information circle 114 on Service Coupon Page 16 and mail now.

Back Filling Conveyor

An improved conveyor for back filling ditches, trenches, curbing, or pipe lines has been announced by Power-Pack Conveyor Co., 13910 Aspinwall Ave., Cleveland 10, O. Designed to unload material smoothly, cleanly, and quickly from dump truck to ditch, the new conveyor attaches to the hauling vehicle and delivers material up to 8-ft. beyond the side of the truck, and at heights up to 3-ft.

New and exclusive feature of the unit is its adjustable discharge deflector for easy control of material placement. Convenient control of belt speed and volume of material delivered to the belt assures smooth placement of material without spillage. These adjustments can be made while the unit is in action from an operator platform positioned for excellent visibility.

According to the manufacturer, the conveyor is easily and quickly connected and disconnected from hauling vehicles by means of a cable hitch. Conveyor belt is powered by an 8-h.p. gasoline engine, has a capacity of 3 tons per minute and is stated to be able to unload and distribute more than 700 tons of material per day using only two men. Hopper capacity is 2 cu. yd. The conveyor section of this new conveyor can be removed for use separately, and the hopper also can be used without conveyor as a spreader.

Power-Pack Conveyor

For more information circle 115 on Service Coupon Page 16 and mail now.

Truck Tire Tool

A new invention for demounting truck tires quickly and eliminating the use of pry bars and sledge hammers has been announced by Harvel Co., 5125 Coffman-Pico Road, Pico, Calif. This tool also eliminates the danger of lock rings from "exploding" when the tire is being inflated. It guarantees 100% controlled safety.

Break-Safe Truck Tire Tool

The tool consists of a metal conical shaped base on which the truck wheel and tire is mounted, a "spider" consisting of four cross bars with a lever and lead screw which is screwed by hand into the top of the conical shaped base, and a set of four pressure pads which are positioned by hand over the tire head or wheel rim or lock ring (depending on type of wheel).

Pressure is evenly exerted on the bead or rim by turning the lever. After the tire is demounted from the rim on one side it is turned over and the same procedure followed. Even on tires with rusted rims and rubber adhering to the metal the complete demounting takes only a few minutes and damage to the wheel is prevented because sledge hammers are not required. Total net weight of this tool, including an extra set of accessory pressure pads, is approximately 135-lb. It is portable and can be carried on repair trucks for field service.

For more information circle 116 on Service Coupon Page 16 and mail now.

Rotary Drill

A new, heavy duty rotary drill for vertical blast holes has been announced by the Winter-Weiss Co., 2201 Blake St., Denver 5, Colo.

Known as the Model 6Ta, this addition to the Portadrill line has been field tested over a two year period with outstanding results according to company engineers.

Mounted on a Caterpillar D-6 diesel prime mover, the drill utilizes compressed air for cuttings removal. Two rotary compressors, operating singly or together provide a maximum of 85 psi air pressure with normal drilling pressures of 15-psi.

Up to 27,000-lb. weight can be applied on the bit and using standard oil field roller cone rock bits, the drill is stated to average a foot or more a minute of 9-in. hole in most formations.

The drill is completely unitized with no auxiliary equipment needed. All power is supplied by the tractor engine through a heavy duty transfer case. All controls are located at the rear of the drill where the operator has full view of drilling operations. Dust control and cuttings collector systems are provided as the job requires. Two men operate the rig with complete efficiency although one man can complete shallow holes alone.

Model CTA Portadrill

For more information circle 117 on Service Coupon Page 16 and mail now.

Hopper Bottom Dump Trailers

A completely new line of hopper bottom dump trailers, has been announced by Fisher Manufacturing Co., Mt. Pleasant, Michigan.

The outstanding features of these trailers, include an integral framing system that completely eliminates the presence

(Continued on page 158)

Fastens on standard dump truck

Wheel adjusted to ride on top of last pass

Carried on dump truck gate

LITTLEFORD TRUE-LAY paver-spreader

produces compaction equal to 80% of heavier, more expensive pavers

Here's why only Littleford can make this statement:

1. 60% more weight. True-Lay weighs 1600 lbs.; heaviest comparable unit weighs 1000 lbs.
2. Patented arrangement puts 75% of the weight of the True-Lay *and* material on the compaction screed.

Here's what this means to you:

1. more economical paving and spreading.
2. roll sooner. With True-Lay greater compaction, you get the roller on the asphalt faster . . . and less rolling is required.
3. labor saving. You need only a raker, shoveler and screed operator for the True-Lay. Compare this with the 7 or 8-man crew required for other units.

Here's where:

Only Littleford makes the True-Lay paver-spreader. For complete information, use the convenient coupon below and send for Bulletin 33, Littleford Bros., Inc., Dept. 229 A 454 E. Pearl St., Cincinnati 2, Ohio.

Lay a better mat

for less with True-Lay
New bulletin 33 tells how.

1882 - 1957 75 LITTLEFORD CINCINNATI TOPS IN BLACK TOP

Gentlemen:
Please send me at once and without obligation, copy of new True-Lay bulletin 33.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

LITTLEFORD world's most complete line of completely engineered black top equipment

. . . for more details circle 235, page 16

9H Special Tandem and 4 Wheel Trailer Showing Unobstructed Body Interior

of cross members within the load carry hopper and large discharge door.

At present three basic models are being produced for immediate delivery, a 20 cu. yd. capacity 9-ft. spread tandem, a 15 cu. yd. 4 ft. spread tandem and a 10 cu. yd. 4 wheel trailer.

For more information circle 118 on Service Coupon Page 16 and mail now.

Street Marking Compound

A marking compound—Perma-Line—for streets, parking lots, airfields and industrial safety zoning, is now being introduced by the Veon Chemical Corporation, 22-09 Bridge Plaza North, Long Island City, N.Y.

The material is applied in a quick one-man operation, requires only a brief ten minutes to dry and is guaranteed to last at least five times as long as paint.

The great durability of Perma-Line stems from the fact that after being applied in an ⅛-in. thickness at 400 degrees Fahrenheit with a gas-heated applicator, the material fuses with the pavement as a hard and fast part of the surface.

Its radiance is derived from the various resins in the compound which cause it to bleach when exposed to sunlight, insuring against fading or discoloration. The compound is available in colors of both yellow and white.

For more information circle 119 on Service Coupon Page 16 and mail now.

Laboratory Compression Testing Machine

A new multi-purpose compression testing machine, the Versa-Tester, has been announced by Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill. The new low cost testing machine is designed for routine and research compression and flexure of such materials as soils, asphalt, mortar, concrete, plastics, metals, wood and ceramics.

The Versa-Tester has a load capacity of 30,000 lb. (also available in metric calibration) and is accurate to within 1% of indicated load. It complies with ASTM specifications for hydraulic testing machines. Each testing machine is furnished with a calibration certificate.

The working mechanism is enclosed in an attractive two tone grey steel cabinet. Front and back panels are easily removed for access to the working parts. Two handily placed controls make it easy for the engineer or scientist to operate and adjust the machine. Maximum specimen clearances are 12 in. wide by 18 in. high allowing a wide range in specimen sizes.

Versa-Tester Compression Testing Machine

For more information circle 120 on Service Coupon Page 16 and mail now.

Hydra-Hammer Has Increased Power

A new model Ottawa Hydra-Hammer, announced by Ottawa Steel Division, L. A. Young Spring & Wire Corp., Ottawa, Kan., has a larger engine and heavier hammer which are claimed to produce greater production on all pavement breaking, cutting, and backfill tamping jobs.

The illustration shows a new Model SPHH-1000 Hydra-Hammer removing multi-layer pavement (consisting of several inches of asphalt or asphaltic concrete over granite block, which in turn had been laid over a concrete base), for the installation of underground high tension power line on a main thoroughfare in downtown Columbus, O. Without obstructing traffic, the SPHH-1000 Hydra-Hammer is stated to have accomplished the job in one-half the time, at a saving of one-third to one-half the cost of conventional methods.

The 7500 ft.-lb. blow developed by the Model SPHH-1000 Hydra-Hammer is actually controlled so that the maximum blow, or a minimum blow as little as 100-ft.-lbs., can be used at the operator's will. This makes it possible to compact heavy clay soils in 4 to 6-ft. lifts, and light sandy soils over terra cotta pipe in as little as 18-in. lifts.

Model SPHH-1000 Ottawa Hydra-Hammer

For more information circle 121 on Service Coupon Page 16 and mail now.

Rock Rippers

The heavy-duty tractor mounted rock ripper line for 1957 of the American Tractor Equipment Co., 9131 San Leandro Blvd., Oakland 3, Calif., features improvements in shank design, added ruggedness and greater protection for the tractor.

Exclusive drawbar mounting arrangement is stated to let the rugged Ateco drawbar take the pull and protect the tractor transmission case against damage.

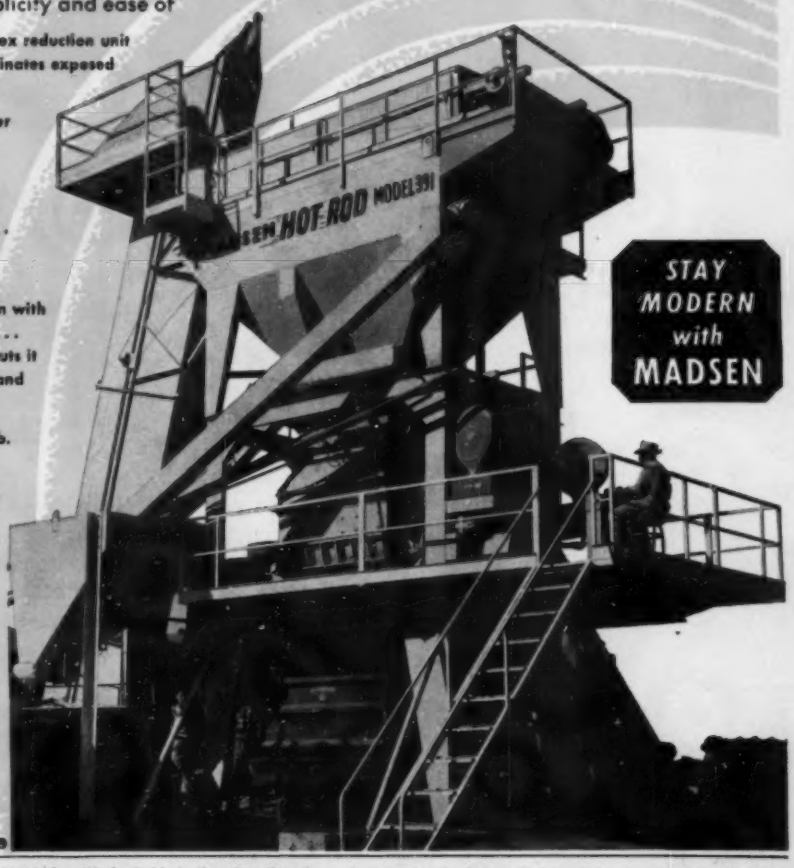
(Continued on page 161)

RIGHT NOW... is the time to "Feature Check" the NEW

MADSEN HOT ROD ASPHALT PLANT

As the big road-building program swings into high gear . . . MADSEN offers the industry the sensational new Model 391 HOT ROD Asphalt Plant. You will want to check this plant feature-by-feature because it incorporates many engineering advancements never before offered in any asphalt plant. The HOT ROD has no "excess baggage". It is streamlined in design and very easy to service. It has a minimum of removable parts for transport, a good bin capacity and a choice of mixer sizes. Its simplicity and ease of operation can mean a daily increase in production of a 100 batches over conventional asphalt plant operation. The 5000-lb. MADSEN HOT ROD Plant is capable of producing up to 250 T.P.H. of close specification mixes. No other Asphalt Plant matches the New MADSEN HOT ROD in years-ahead features. A few of these features are shown below . . . check them and then get the complete story from your MADSEN distributor.

- New fully-enclosed (running in oil) gear box reduction unit that goes right to the mixer shafts . . . eliminates exposed mixer timing gears.
- Famous MADSEN Twin-Shaft Pug Mill Mixer (Patented) with externally removable sectional liners, improved mixing action and faster discharge.
- Simplest, cleanest design in the industry . . . with a minimum of removable parts for easy transport and fast set-up.
- MADSEN Asphalt Pressure Injection System with new rotating distribution bar (Patented) . . . injects the asphalt into the mill quickly—cuts it off sharply to give you improved mixing and reduced mixing time.
- Available in 3000-lb., 4000-lb. and 5000-lb. batch capacities.
- Operator station on end of plant . . . with swivel-head asphalt and aggregate scales and all controls conveniently located for easy, fatigue-lessening plant operation.
- Fast air operation of bin gates, asphalt pressure injection system and mixer gate.
- Exclusive bin design (Patent Pending) eliminates segregation.
- In-built breathing device.



STAY MODERN with MADSEN

MADSEN Equipment that Serves

Ask your Madsen Distributor for Catalog No. 391 or write Madsen Works, Baldwin-Lima-Hamilton Corp., Construction Equipment Division, P.O. Box 38 La Mirada, Calif.

THE MADSEN LINE OF PRODUCTS
FOR THE ASPHALT PAVING INDUSTRY
INCLUDES

ASPHALT PAVING PLANTS • PUG MILL MIXERS • AGGREGATE DRYERS • DUST COLLECTOR UNITS
ROAD PUG TRAVEL-MIX PLANTS • WEIGH BATCHERS • SUPER FLOAT AND JOHNSON FLOAT FINISHERS
ASPHALT TANKS • ROYAL CROWN PUMP VALVES • ASPHALT AND FUEL PUMP UNITS

MADSEN WORKS
BALDWIN-LIMA-HAMILTON
CONSTRUCTION EQUIPMENT DIVISION
DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Hamilton • Lima • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works

. . . for more details circle 239, page 16

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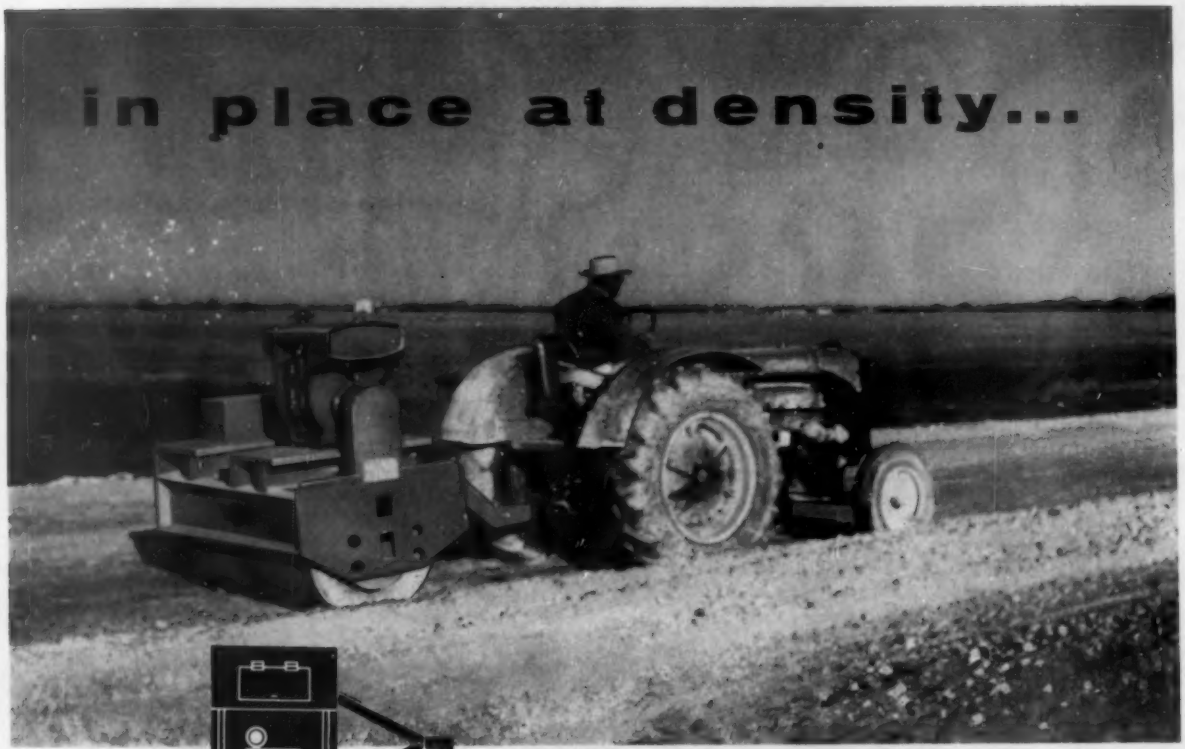
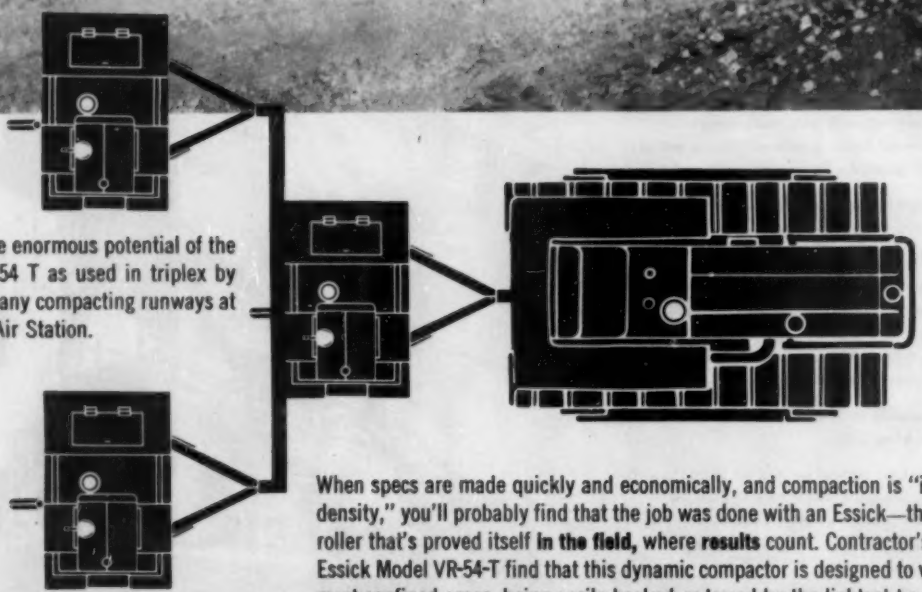




Drawing shows the enormous potential of the Essick Model VR 54 T as used in triplex by S. J. Groves Company compacting runways at Lakehurst Naval Air Station.

When specs are made quickly and economically, and compaction is "in place, at density," you'll probably find that the job was done with an Essick—the vibrating roller that's proved itself **in the field,** where **results** count. Contractor's using the Essick Model VR-54-T find that this dynamic compactor is designed to work in the most confined areas, being easily backed or towed by the lightest tractor. 4 to 6 single passes with an Essick will compact 21" of granular material to the most rigid specifications.

If you're looking for compaction **plus** profit, you'll find that the Essick Model VR-54-T has an amazingly low first cost, a low operating cost, and can actually save **two-thirds** on spreading and rolling operations.

—and for sheer power and ability, the Model VR-54-T is used in both tandem and triplex hook-ups for the most potent package of compaction tools available today.

ESSICK MANUFACTURING COMPANY

1950 SANTA FE AVE., LOS ANGELES 21, CALIF.

850 WOODRUFF LANE, ELIZABETH, NEW JERSEY

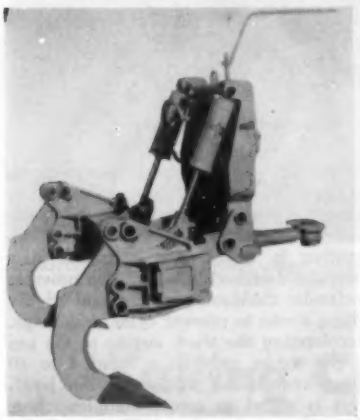
AFFILIATED WITH THE T. L. SMITH COMPANY, MILWAUKEE, WISC.

ESSICK®

. . . for more details circle 309, page 16

Optional direct-drive pump permits continuous hydraulic power for ripper control, unaffected by clutch or torque transmission operation. Extra-rugged design includes tool beam of welded box design in which solid steel, not the weld, takes the strain.

Curved, specially-contoured shanks are of manganese-moly steel, heat treated four times for strength and toughness. Replaceable rock points have splitting wedges; underground "quiver" of curved shanks is stated to work like a jackhammer to shatter rock and shale fast, with less power. Rock is rolled up and out in the clear, back of tool beam.



Heavy Duty Ateco Ripper

For more information circle 122 on Service Coupon Page 16 and mail now.

Concrete Conveyor

A new 40-ft. concrete conveyor, Model 618-B, has been announced by the Fairfield Engineering Co., Marion, O. The model features a concrete swiveling chute, a belt wiper, a concrete hopper, and can be obtained with head end control for starting and stopping the belt. The belt is 18-in. wide and runs on triple troughing type idlers. A self-cleaning foot pulley is located at the foot end.

The capacity varies with the slump of concrete used and discharge heights. It is stated 24-yd. of concrete per hour can be poured at a discharge height of 16-ft. The unit can be raised to 26 ft.

For more information circle 123 on Service Coupon Page 16 and mail now.

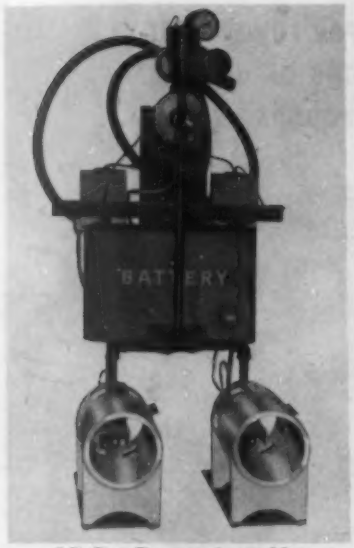
Asphalt Truck and Tar Kettle Burner

A new propane (L. P.) gas burner assembly for asphalt trucks, tar kettles and other pieces of equipment where quick clean heat is required, has been announced by Flamegas Detroit Corporation, 12901 Auburn Ave., Detroit 23, Mich.

The new burner assembly, available in three models, will deliver up to 2,000° and is designed for long life and easy installation.

The burner will operate on gas pres-

(Continued on page 162)



LP Gas Burner Assembly

sures from 30 to 120-lb., and has two burner speeds. At a 30-lb. setting, on high speed, the burner will put out 313,000 B.T.U.'s per hour and consume approximately 14-lb. of fuel. At a 30-lb. setting, on low speed the burner will put out 151,000 B.T.U.'s per hour and consume approximately 7-lb. of fuel.

Attachments are available for use in: spray bar heating, pump preheating, sand drying, spot repair preheating and drying, weed burning, lead melting, etc.

For more information circle 124 on Service Coupon Page 16 and mail now.

Three Crane-Shovel Models

Three new crane-shovel models have been announced by the "Quick-Way" Truck Shovel Co. P.O. Box 1800, Denver, Colo. One, the "Quick-Way" model 85-A, is a truck mounted 4/10 cu. yd., 8½-ton convertible crane-shovel. "Quick-Way" model 105AC is a crawler mounted version of the 5/10-cu. yd. model 105A. The company will also offer the "Quick-Way" 85AC a 4/10-cu. yd. crawler mounted shovel.

The new 85A, combining mobility with easy maintenance, offers many new features designed with the operator in mind.

Maximum efficiency and quiet operation is gained by using an ideal combination of chain and gear drives. The main jack shaft is powered from the engine by a heavy duty, three strand roller chain operating encased in an oil bath. The simple precision machined steel gear train transmits power to the main drum shaft and swing shaft. The boom hoist operates from the main drum shafts and from the swing shaft by two single strand roller chains. This combination is stated to make possible the most efficient transmission of power through a minimum of moving parts.

The entire steel main machinery frame is welded in one piece. All bearing mounts are machined after welding for precision alignment. The machine has been completely redesigned and engineered for simple, economical operation.

"Quick-Way" Model 85-A Truck Mounted Crane Shovel

The "Quick-Way" model 102AC crawler, equipped with 24-in. cast steel track shoes is available with 16 and 32-in. shoes. The crawler is powered from a second, standardswing drum assembly taking power from the crane engine. This permits two speed, two direction—independent travel. It is driven by two single strand, heavy duty roller chains and machined steel sprockets.

The crawler has speeds in forward and reverse of 7/8 miles per hour in low range and 1¾-miles per hour in high range for greater power and maneuverability. Controls are all located within reach of the operator in the streamlined cab for easy, one-man operation.

The truck mounted model 85-A and Model 105-AC crawler are available now. The model 85-AC crawler will be available in April.

For more information circle 125 on Service Coupon Page 16 and mail now.

High-Speed Telescopic Hoist

A new single front mounted telescopic hoist, stated to be capable of raising and dumping in less than 6 seconds, has been announced by Hercules Steel Products Co., Galion, O.

Known as Model 1215, the new 5-in. telescopic hoist has been designed for use on high-speed batching operations or wherever fast dumping action is essential. The hoist is said to raise to full dump position in 6 seconds. A special new Hercules-designed bleeder valve provides hydraulic cushioning at the end of the lifting stroke to prevent cylinder damage. Accelerating the truck engine at the top of the stroke provides a rapid 4 to 10 rising and falling motion of the body. This is stated to assure complete, fast, clean dumping, without "frogging" the truck, it is claimed.

Herculets Model 1215 High-Speed Telescopic Hoist with Hercules Model CD Body and Model 15 Batch Boxes

A Hercules heavy-duty high output pump provides the large volume of oil necessary for high-speed hoist action, the manufacturer states. Cooler operating temperatures are said to be afforded by the 22 gal. capacity of the hoist system.

For more information circle 126 on Service Coupon Page 16 and mail now.

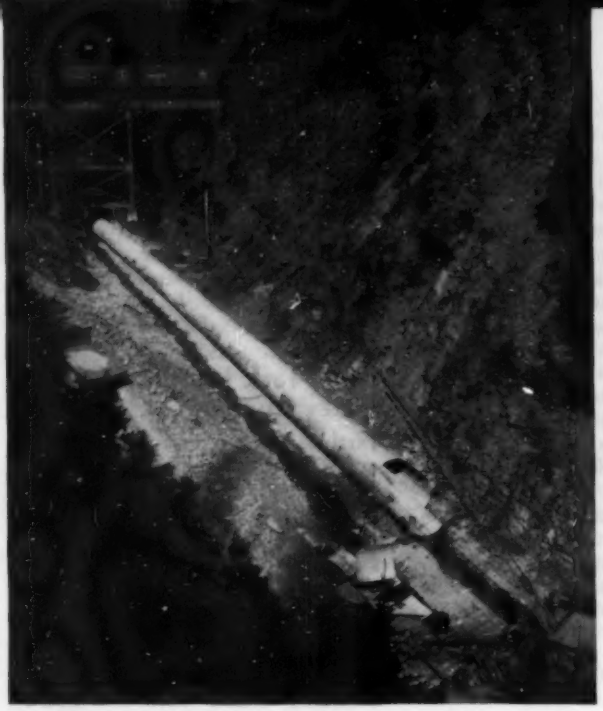
Tractor Loader

A newly designed utility loader, termed the "Kaw" loader, has recently been marketed by the Shawnee Manufacturing Co., 1947 North Topeka Ave., Topeka, Kans. The new "Kaw" loader has a 10-cu. ft. rollback bucket actuated by twin, 2-in. double-acting cylinders. Lifting cylinders are 2½-in. bore and hoist 1250-lb. to 9-ft. dumping height. The hydraulic system comprises an 11-gal. crankshaft driven pump and permanent piping with 1000 psi by-pass protection. Controls are fingertip type located at the right of the steering wheel.

According to Shawnee the operating cycle for the loader is 5 seconds to full dumping height, 3 seconds to down position.

Kaw Loader

For more information circle 127 on Service Coupon Page 16 and mail now.



● The 56-degree curve at "Devil's Elbow," scene of a recent realignment job.

● Part of the Armco Multi-Plate pipe in place — 102 in. diameter and 418 ft. long when completed. Bolted construction was easily handled by a small crew with mobile crane.

Taking Crook Out of "Devil's Elbow"

A SPECTACULAR realignment job was recently completed on U.S. Highway 2, east of Nyack, Montana, on the southern boundary of Glacier National Park. Costing $1,188,000, the work was for the highway which skirts the edge of the park for about 60 miles in rugged mountainous country.

A 5.5 mile section of this important transcontinental highway, built in 1925, had several severe curves that were definitely not up to modern road building standards. One of these was a 56-degree curve well-named "Devil's Elbow," and a bad traffic hazard. The roadway width was 22 ft., 18 ft. of which was paved. The realignment, designed and supervised by the Bureau of Public Roads, provides a new pavement 32 ft. wide.

The roadway now crosses Devil's Elbow on a 125-ft. fill, eliminating the dangerous curve. Extreme height of the fill influenced the engineers to specify structural plate metal pipe for the drainage that carries Crystal Creek under the highway.

The structure selected for the waterway opening was 102-in. diameter Armco Multi-Plate pipe, 418 ft. long. For reasons of economy the pipe was assembled from 1, 3 and 5 gauge plates. Where cover was 50 ft. or more, 1-gauge metal was used. For less than 50 ft. of cover, invert plates were 3-gauge, side and top plates 5-gauge. The pipe was formed as a 5 per cent ellipse for utmost strength.

The structural plate pipe was installed on a 4.7 per cent grade with 2 ft. of camber to allow for foundation and fill settlement. It was bedded in gravel and backfilled with native granular material thoroughly tamped in alongside the pipe. Struts maintained the vertical diameter while backfilling was being done. The pipe was assembled with a crew of eight men and truck-mounted crane.

Other drainage structures on the realignment project included a 108-in. diameter Multi-Plate pipe under about 4 ft. of cover.

Grading and drainage contractor was the Tony Marrazzo Company, Boise, Idaho.

Over-Highway Restaurants for Illinois Toll Road

● **Restaurants at five locations along the Illinois toll road, now under construction will be located over the express roadways. This unique design permits access from motorists using either traffic stream, in conjunction with the service stations on each side. The design saves right-of-way space.**

Engineers Corps Tests Big Earth Augers

TWO portable earth augers, designed to dig holes to considerable depths at rapid rates, are undergoing tests at the Corps of Engineers' Research and Development Laboratories, Fort Belvoir, Virginia.

Developed by the H. B. Williams Manufacturing Company of Dallas, Texas, they are being considered for use in construction of field fortifications and emplacements, shallow wells and waste disposal pits. Other possible applications are also under study.

The larger of the units weighs approximately 50,000 lb. Powered by a 192-hp gasoline engine, it is capable of digging holes up to 9 ft. in diameter and 75 ft. deep in many types of earth strata. Mounted on a standard military 25-ton low bed trailer, the unit is 89 ft. long in its traveling position. It features a turntable which permits digging and discharging of spoil on either side of the trailer.

A 5¼-in. square kelly bar with a 2-in. hole in the center makes possible the use of air, water and Calyx drilling attachments. Augers, auger buckets for wet material, and core barrels for drilling in rock are standard attachments.

Digging operations have been successfully conducted in sandy loam, calechie and decomposed granite. In sandy loam, the unit dug a huge hole on an average of a half-foot per minute.

The unit's "kid brother," a husky 34-ft. 24,448-pounder which utilizes smaller versions of the same components, can dig holes up to 6 ft. in diameter and 22 ft. deep. Truck-mounted, it is highly mobile.

● (Inset scene) This auger can dig a 6-ft.-diameter hole to depths of 22 ft., and is also capable of digging at an angle as shown.

● Trailer-mounted earth auger under test can dig a 9-ft.-diameter hole 175 ft. deep.

Small rock in asphalt mixes studied

Part of the test and research program of the headquarters staff of The Asphalt Institute is a project to investigate bituminous paving mixes. In this connection, John M. Griffith reports a surprisingly high Marshall stability value in the 45% coarse aggregate range.

According to a statement published recently, this finding differs from that of the Corps of Engineers at the Vicksburg flexible pavement laboratory where studies have shown maximum stability at approximate 60% coarse aggregate content. While noting that the investigations are far from conclusive, Griffith observed that the curves established in a recent investigation present interesting speculative possibilities.

A reduced fraction of coarse aggregate in paving mixes could have important economic significance to road builders. The abundance of fine aggregates and the spotty scarcities of satisfactory coarse aggregates suggest that, if the Marshall method curves are supported in later test procedures, improved asphalt mixes may be developed at a saving. The saving would result from a reduced use of costlier coarse aggregates in the paving mix.

Griffith explains that the compaction method used in the Institute laboratory differs from the one employed at Vicksburg. "The compaction procedure used at Vicksburg for their early studies along this line was that originally established by Bruce Marshall in his pioneer work, establishing some of the basic features of the Marshall Method. This original compaction procedure was later modified by the Corps of Engineers on the basis of extensive field and laboratory investigations. The modified compaction method, now 'standard' in Corps of Engineers procedures, was the one used by The Asphalt Institute in its studies:" Also of possible significance

is the fact that the sand fractions being used in the entire series indicate a high Marshall stability value.

The Institute's laboratory program embraces one of the most comprehensive studies of bituminous paving mix design ever undertaken. Nine types of coarse aggregates, considered to be representative of substantial construction usage throughout the United States, are being used in various combinations with fine fractions and at varying asphalt contents. Recently completed was a series of tests employing the Marshall method. A similar cycle of tests using the Hveem procedure is now under way and the studies will continue through a limited number of other test methods.

The nine aggregates include New York traprock, Ohio Limestone and slag, California and South Carolina granite and gravel from Maryland, Tennessee, Michigan and Washington.

Four or more different gradations are being used with the aggregate types, ranging from 25% coarse aggregate (retained on the No. 8 sieve) to as high as 85% of coarse aggregate. Maryland sand from a single source is being used throughout the initial test series as the fine aggregate fraction, and a limestone dust is being used for the entire minus No. 200 fraction of all tests. Other fine aggregates and mineral fillers will receive attention, however, during later phases of the study. The asphalt used is 85-100 penetration.

The optimum asphalt content for all the different coarse aggregates and all practical gradations ranges from 4.3% to 6.8% based on total mix. All of the low absorptive aggregate mixtures indicate Marshall optimum asphaltic contents of first a decreasing and then an increasing trend, passing from a low to a high coarse aggregate content.

Generally, all of the different aggregates exhibit increasing, and then decreasing Marshall stability values at optimum asphalt content with increasing coarse aggregate fractions. Maximum stability values were reached near a 45% content.

The Institute's research engineer points out another interesting finding in the first test series. Marshall stability values at optimum asphalt content were influenced by as much as 700 lb. depending on the type of coarse aggregate used with a coarse aggregate content of as little as 25%.

Throughout all gradation ranges in the first phase of the study, those coarse aggregates having the more crushed or rough and angular particles indicated the highest stabilities.

The Institute's comprehensive program calls for a continuing cycle of tests to determine the effects of types of coarse aggregates on properties of asphalt paving mix. This will be followed by companion studies on fine aggregates, mineral fillers, consistency of asphalt cement and aggregate gradations. These studies, expected to extend well into 1957, will complete the first half of an exhaustive investigation into paving mix design.

"The design and construction of an asphalt pavement for too long has been hovering in the twilight zone between an art-form and a science," notes Griffith.

McCormick Named General Sales Manager. E. E. McCormick, heretofore special railroad sales representative for Koehring Co., has been appointed general sales manager for the Buffalo-Springfield Roller Division of the Koehring Co.

Henderson Promoted by Sherman Products. Warren E. H. Henderson, formerly a zone manager, has been named assistant sales manager of Sherman Products, Inc., Royal Oak, Mich. He will direct advertising and sales promotion activities.

H & R Names Krebs. William G. Krebs has been appointed director of sales of Harrington & Richardson, Inc., Worcester, Mass., and Rowco Mfg., Co., Inc., Keene, N.H., an H & R subsidiary. Carl H. Howe, Jr., has been appointed sales manager of Harrington & Richardson and Brushmaster companies.

Hall Named General Sales Manager. Charles C. Hall, formerly sales manager of highway products division of United Steel Fabricators, Inc., Wooster, O., has been appointed general sales manager of the company.

D'Amato Appointed Product Manager. James G. Morris, industrial sales manager for Seaman-Andwall Corporation, Milwaukee, Wis., has announced the appointment of Frank D'Amato as product manager for their line of Century material spreaders. Mr. D'Amato has been designing and sales engineer for Century Engineering Co., Waukesha, Wis., for eight years prior to the purchase of that company's line of Century materials spreaders by Seaman-Andwall.

New Vice Presidents Oliver Corporation. Samuel W. White, Jr., and Donald W. Koegle have been elected vice presidents of the Oliver Corporation, Chicago, Ill. Mr. White will head the industrial sales division and Mr. Koegle will have charge of domestic farm machinery sales. Edward H. Fisher, vice president, formerly manager of the industrial sales division, has been appointed head of the newly created special products division.

Manufacturers' Literature

Aluminum Supports for Signals

A new catalog (TE-1) on all aluminum supports for traffic control signals and signs has been issued by Pfaff & Kendall, 84 Foundry St., Newark 5, N.J. It illustrates and describes standards, spans, pedestals, and accessories, many of which are newly designed to solve the increasing complexities of traffic control.

For more information circle 140 on Service Coupon Page 16 and mail now.

Telescopic Hoists

A new 4-page catalog describing its complete line of telescopic hoists has been issued by Galion Alsteel Body Co., Galion, O. The catalog describes and illustrates various Uni-scopic single front mounted and Duo-scopic twin front mounted telescopic hoists. Descriptions and specifications cover 9 hoist models, with payload capacities from 9 to 34 tons. The catalog, profusely illustrated, contains action, detail and cutaway photos. Matching bodies and payload-adding accessories are also shown.

For more information circle 141 on Service Coupon Page 16 and mail now.

How to Operate a Lift Truck

"How to Operate a Lift Truck", an informative 24-page, 2-color, booklet (Form 1214) is available from Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oregon. The 2-color cartoon technique used in the booklet is designed for easy reading and is packed with information about the operation of a lift truck, preventive maintenance, safety and basic materials handling. Drawings for setting up an obstacle course are also included.

For more information circle 142 on Service Coupon Page 16 and mail now.

Controlling Wire Rope Costs

The Service-Score system for controlling wire rope costs is the subject of a new illustrated folder available from Leschen Wire Rope Division, H. K. Porter Co., Inc., 2727 Hamilton Ave., St. Louis 12, Mo. It is described as an easy method of fact-finding to increase wire rope operating efficiency and help to reduce supply and maintenance costs. Sample set of Service-Score stickers sent with the folder.

For more information circle 143 on Service Coupon Page 16 and mail now.

Foundation Services for Highway Structures

A brochure titled "Foundation Services for the National Highways", released by Raymond Concrete Pile Co., 140 Cedar St., New York 6, N.Y., illustrates the company's facilities for constructing foundations for highway structures. Also shown are many bridges and crossovers which are supported by Raymond pile foundations. Among the illustrations is the world's longest overwater highway bridge, the Lake Pontchartrain Causeway, 23.8 miles long, which is supported on Raymond prestressed concrete piles. The brochure also illustrates representative bridges and highways that Raymond subsidiaries have constructed in foreign countries.

For more information circle 144 on Service Coupon Page 16 and mail now.

Semi-Automatic Welder

A new two-color six-page brochure (Bulletin No. 6-56) on the AMSCO Semi-Automatic Welder for hardfacing is available from American Manganese Steel Division, Dept. A, Chicago Heights, Ill. The new brochure includes cross-sectional and cutaway drawings of the Amsco "MF" Welder and its component parts and explains in some detail how the machine operates. The brochure includes a section on the new Amsco tubular electrodes for semi-automatic manganese steel build-up and hardfacing plus a list of their applications in different industries.

For more information circle 145 on Service Coupon Page 16 and mail now.

Engine Preheaters

Its complete line of automotive, truck and heavy equipment engine preheaters is covered in a set of catalog sheets issued by Dept. KP, Phillips Mfg. Co., Inc., 2816 Aldrich Ave. S., Minneapolis 8, Minn. Included among the heaters illustrated is the new Zero-Start external tank-type engine heater which features universal application to all liquid cooled engines. Others shown are the standard headbolt and oil immersion type heaters.

For more information circle 146 on Service Coupon Page 16 and mail now.

Street Sweeper

A new street sweeper with a hopper capacity of more than 4 cu. yd. is described in a 16-page catalogue published by Wayne Manufacturing Co., 1275 E. Lexington Ave., Pomona, Calif. The three-color leaflet contains complete technical information about Wayne's Model 550 sweeper. Described are such features as power steering, power brakes, 275-gal. water capacity, and directional turn signals—all standard equipment.

For more information circle 147 on Service Coupon Page 16 and mail now.

Core Drilling Machine

A new 8-page Bulletin No. 350, covering their field-tested MODEL 30 is available from Sprague & Henwood, Inc., Scranton 2, Pa. This bulletin describes and illustrates in detail all of the features. It also contains complete specifications and types of mountings which are available.

For more information circle 148 on Service Coupon Page 16 and mail now.

Lubricants for Contractor Equipment

A new bulletin entitled "Keystone Specialized Lubricants for Contractor Equipment", is available from Keystone Lubricating Co., 3100 N. 21st St., Philadelphia 30, Pa. Identified as Bulletin BU-58, it deals with special lubricants for contractor equipment used in (1) earth moving, (2) strip mining, (3) quarrying, (4) road building, (5) excavating, (6) logging, (7) dredging, (8) erecting and (9) allied fields. This 6-page bulletin describes the application of Keystone grease and oil to 24 different types of heavy equipment. Fourteen photos illustrate these applications.

For more information circle 149 on Service Coupon Page 16 and mail now.

Bit and Rod Shop Equipment

Bit and rod shop equipment for fast and economical bit and steel reconditioning are covered in Form 4187, available from Ingersoll-Rand, 11 Broadway, New York 4, N.Y. The form covers a complete line of jackbit grinders for small and large Carset bits and small steel bits. Drill steel and bit furnaces for heating to forging temperature and for tempering are part of the blacksmith equipment offered. Drill steel sharpeners, steel cutter and shank grinders round out the line.

For more information circle 150 on Service Coupon Page 16 and mail now.

(Continued on page 180)

BIG things are *happening* at Cummer!

William C. Swalley
President

FOR IMMEDIATE RELEASE:

Cleveland, Ohio: William C. Swalley, 25-year veteran Vice President of Wellman Engineering Company, with world-wide experience, has resigned to become President of Cleveland's F. D. Cummer & Son Company, oldest and best-known builder of quality asphalt plants.

Carl C. Clayton, Wellman's Secretary-Treasurer for 28 years, has also joined the Cummer organization as Vice President, Treasurer and Director.

R. N. Birdsall, Cummer's General Manager and Chief Engineer, has been elevated to the additional post of Vice President during the current executive changes.

Joseph R. Black, having wide experience in both sales and engineering of steel fabrication as related to asphalt producing plants, has been appointed Sales Manager.

R. N. Birdsall
Vice President
General Manager

Joseph R. Black
Sales Manager

IMPROVED customer service is the keynote of the new, revitalized Cummer organization. We can now provide any engineering service required by the asphalt-producing industry. Erection engineers are supplied without cost until your new plant is completely set up and in proper working order—even to seeing that your personnel are proficient in its operation.

As every Cummer asphalt plant is produced to our customer's specific operating requirements, continual expert supervision is exercised from its design inception to operating delivery. All obsolete equipment and procedures have been replaced with the most modern engineering and fabricating techniques. Yes, *big* things are really happening at Cummer!

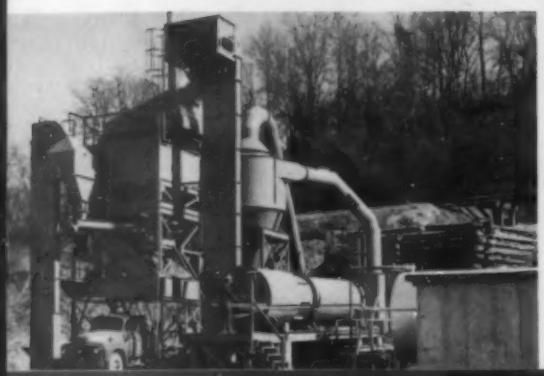
CUMMER

Designers and best known builders of fine asphalt plants!

THE F. D. CUMMER & SON COMPANY

2110 EAST 21st STREET • CLEVELAND 15, OHIO

Cummer's dependable, high production asphalt plants are available in the following types—*all designed to your specific operating requirements*



Cummer portable asphalt plant

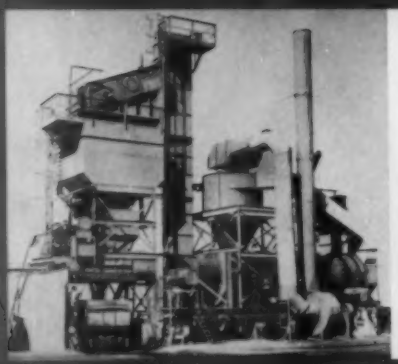
Two sizes now available—50-60 and 60-70 tons per hour capacity guaranteed (based on 5% initial water content, dried to within ½ of 1% and heated to 350°-400° F.).

Truly portable, this model of Cummer Asphalt Plant can be assembled in as few as 12 hours, then disassembled for fast transportation to another location.

Mixers—2,000-2,500 lbs. Hot Bins—25 tons, 4 compartments.

Complete with all motors and starter switches. No chain or belt drives. All moving parts are individually motor driven.

COLD MATERIAL HOPPER AND FEEDER—25 tons



Cummer semi-portable asphalt plant

Available in two sizes—70-80 and 90-100 tons per hour capacity guaranteed (based on 5% initial water content, dried to within ½ of 1% and heated to 350°-400° F.).

Mixer—4,000 lbs. Hot Bins—60 tons, 4 compartments.

Designed for electric power. Each drive is equipped with individual motor or gear motor, thus eliminating shafting, sprockets, chains and belt drives.

All motors and starter switches are included in the complete plant.

COLD MATERIAL HOPPER AND FEEDER—25-40 tons

Cummer stationary asphalt plant

Four sizes of Cummer Stationary Plants—80-90, 100-120, 120-140 and 150-180 tons per hour guaranteed capacity (based on 5% initial water content, dried to within ½ of 1% and heated to 350°-400° F.). Mixers—4,000, 5,000, 6,000 lbs. Hot Bins—60, 70 or 90 tons, 4 compartments.

Power is electric and each drive is equipped with an individual motor or gear motor. Shafting, sprockets, chains and belt drives are thereby eliminated. Complete plants include all motors and starter switches.

COLD MATERIAL HOPPER AND FEEDER—40-100 tons

On all Cummer plants, combustion is by means of either gas or oil using high pressure steam or low pressure air as the atomizing agent. Storage tanks, jackets, etc. may be heated by steam or hot oil.

CUMMER

The F. D. Cummer & Son Company

DESIGNERS AND BUILDERS OF FINE ASPHALT PLANTS

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FOR SALE–RENT

CRAWLERS — SCRAPERS — TRACTORS

1—1955 **CAT D8 HYD 8/5 DOZER,** oil clutch, crankcase guard & pull-hook, ser. #14A1672, series "E", 950 hours. Equipment for above Cat. #29DDPCU.
1—**MOD. #463 CAT SCRAPER,** 2 front 21x25 20 ply, rear 24x29, 24 ply; 450 hours.
1—**D4 CAT 7U2311838R,** elec. starting equipped with Mod. #HT4 Traxcavator, 3114 hrs.; grousers, rails and rollers show 25% wear.
1—**CLETRAC, Mod. #DD.** This machine has been overhauled, new tracks and rails, clean and painted.
1—**D8 CAT** with cable 8S dozer. Cat 25 DDPCU, Serial No. 2U4700 equipped with crankcase guard, pull hook, 24" grousers, elec. starting motor. Excellent condition.
1—**D8 CAT** with cable 25 DDPCU, oil clutch, crank case guard, pull hook, elec. starting motor, Serial No. 2U22000. Excellent condition.
1—**CAT D8** with cable 25 DDPCU, crankcase guard, pull hook, 24" grousers, elec. starting motor, Serial No. 2U4000. Excellent condition.
1—**CAT D7** with LeTourneau 8' 4" dozer, Cat 23 CCU, elec. starter, 20" grousers. Completely rebuilt.

CONCRETE EQUIPMENT — TRUCK MIXERS — MISC.

5—1950 **BLAW-KNOX MIXERS,** 3 yd. with Hercules 6 cyl. engine. Very clean, good operation cond., unmounted.
Also have new and used concrete vibrators, trowlers, saws with or without blades, concrete buggies, etc.

ATTACHMENTS — BUCKETS — ETC.

2—**L40 LORAIN SHOVEL FRONTS,** used very little (1 & 2 months' service). 1 chain and 1 cable crowd.
1—**FAIRLEAD,** for ¾ yd. to 1 yd. machine, Link-Belt type, very good.
1—50' **BOOM FOR LS75 LINK-BELT,** toe end section damaged, PRICED FOR QUICK SALE.

GRADERS — ROLLERS — UNLOADERS

1—**CAT 212 MOTOR GRADER,** 1R118SP tandem drive, 3400 hours, very good running condition.
1—**2 TON LITTLEFORD,** Ser. #26716.
1—**BARBER-GREENE CAR UNLOADER,** steel wheels, Wisconsin engine Md. AHH, new belt, Ser. 608442, very good.
1—**No. 12 CAT** motor grader, Serial 9K2400, mechanically perfect. Tires 75% good.

CRANES — SHOVELS — BACKHOES

1—**BYERS 83 COMB. CRANE, CLAM, DRAGLINE,** 55' boom, 30" shoes, 12'8" long crawlers, powered by Hercules 6 cyl. gas engine; independent boom hoist, travel and swing. Equipped with fairleads, ¾ yd. Hendrix bucket. New 1952. Ser. # 2105.
1—**BYERS 1942 SHOVEL,** 360 degree swing, ½ yd. crawlers, driving sprockets, engine and bucket in perfect cond. Work has to be done on boom and dipper sticks. Machinery deck or upperworks is fair.
1—**KOEHRING** equipped with Wisconsin B-2 engine. Comb. shovel and crane priced to sell as extra parts. Attachments very good.

FOR RENT OR LEASE

1—**LINK-BELT LS70** with Cat D315 engine as comb. hoe, shovel, crane, clam or dragline.
1—**INSLEY K-12** with Chrysler ind. 12 engine; shovel and hoe front only.
1—**GARDNER-DENVER 210 AIR COMPRESSOR** with Buda gas engine.
1—**INTERNATIONAL TD6** with ½ yd. dyd. hi-lift.
1—**LITTLE GIANT** ⅜yd. backhoe, crane and clam mounted on Zeligson T-66 6x6 carrier, both upper and carrier new.
1—**PARSONS 221 DITCHER;** Buda gas engine.
1—**FORDSON** with front-end loader; Sherman backhoe.
1—**OLIVER MODEL 88 BACKHOE.**

WE ALSO BUY EQUIPMENT . . . SEND US YOUR LIST

CHAS. J. DOLAN

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Steam Pile Hammers and Extractors

- DROP HAMMERS
- STEEL LEADS
- DRIVING CAPS
- PILE DRIVER HOSE
- HOISTS AND BOILERS

STEEL SHEET PILING

Pcs.	Section	Length	Location
110	MP-115	60 ft.	Kansas City
100	MP-116	60 ft.	Kansas City
244	MP-116	35 ft.	Wisconsin
260	MP-112	14 to 17 ft.	Iowa
160	MP-116	28 to 30 ft.	Colorado
130	MP-112	19 to 25 ft.	Montana
50	MP-116	24 to 27 ft.	Kentucky

CONMACO — PHONE DRexel 1-3930

CONTRACTORS MACHINERY COMPANY
806 KANSAS AVE., KANSAS CITY, KANSAS

FOR SALE
Bucyrus-Monighan Model 2-W Walking Dragline

2-Yard, 75 Ft. Boom, with Fairbanks-Morse Model 32-E-12 Diesel Engine, 2-cylinder.

Inspection: Brooklyn, N. Y.
Price & Further Details on Request

Construction & Power Machinery, Inc.
270 - 23d St., Brooklyn 15, N. Y.
South 8-4900

GOOD USED EQUIPMENT

THIS EQUIPMENT PRICED FOR QUICK SALE

1—TD14, 8' blade, winch—good condition throughout. Cleaned & painted. $4,850, F.O.B. Mt. Vernon, Ill.

1—HD5G, new rails, rollers & hyd. pump. Motor recently overhauled. Cleaned and painted. $6,250.00. F.O.B. Mt. Vernon, Ill.

1—D-7, 8' inside hyd. dozer & hyster winch. Good condition, cleaned & painted. $8,750.00 F.O.B. Mt. Vernon, Ill.

1—15B Bucyrus-Erie, S/N 63567, combination crane, drag & backhoe. Buda gas engine. Excellent condition. $12,500.00 F.O.B. Mt. Vernon, Ill.

1—Cat. #112 Grader. Good condition. Cleaned & Painted. $5,750.00 F.O.B. Mt. Vernon, Ill.

ILLINOIS TRACTOR COMPANY
Salem Road and Stanley Ave.
Phone 3053
MT. VERNON, ILLINOIS

FOR SALE

Koehring #34 E. Dual Drum Paver #19910.
Lima #34 Paymaster Crane, Dragline #4831.
Lorain L-50 Crane, Dragline #20440.
Cat. #12 Grader #8T 3027.
Cat. #12 Grader #8T 706.
R B Finegrader S/N #405.
Model 848 Barber-Greene Asphalt Plant Complete.
Cat. #20 KW Light Plant.
Hopkins Low Pressure Burners.

All of above equipment located in Southeast

UNITED SOUTHERN CONTRACTORS INC.
P.O. BOX 1152
GREENVILLE, SOUTH CAROLINA

FOR SALE

LATE MODELS — MIDWEST LOCATIONS

Manitowoc 3000-B's, 3500's erect cranes — shovels, long booms, wide long cats diesel. Also 2000-B's.
Northwest 6's, 80-D's, and 95 cranes — drags — shovels, diesels, wide long cats — long booms. Ind. BH's.
Bucyrus-Erie 38-B's, 51-B's, 54-B's, cranes — drags, shovels, diesels, wide long cats — long booms.
Marion, Koehring, Link Belt & Lorain models cranes — drags — shovels, wide long cats — diesels. Also backhoe equipped machines, all types.

JAMES C. FRENCH
228 Berry Pkwy. - Talcott 3-4827
PARK RIDGE, ILLINOIS

INSLEY L ¾ cu. yd. Backhoe. New 1953. Little used. Excellent, $8,250.00. Rental purchase. Our Yard.

BANTAM T35 on GMC 6x6. New 1954. Dragline, 2 Backhoe buckets 24"x36". Concrete bucket. Only been used intermitently. Excellent. $7,500.00 Rental purchase. Yard.

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D13000 Caterpillar diesel power unit including radiator, $3,000; 80 foot steel boom complete for L77 Lorain, $1,000; spare crane parts for L77 Lorain at discount; 90 HP Fairbanks-Morse model 42E 8¾ diesel engine, $2,500; 24" x 16" Cedar Rapids roll crusher smooth rolls. $4,500; model 3xE Gruendler ring hammer crusher, $3,972.50; 78 inch model sophakins classifier, $3,838; 2 cyl. American Engineering Co. towing engine, steam operated, equipped with automatic spooling device, $10,500; new Jeffry & Traylor 36" x 72" feeder type S.L., $2,250; sinden box car loader on wheels, electric, $1,600; 4" x 8" double deck vibrating screen, minus motor, $2,500; 2½ cu. yd. Blaw Knox hopper scales, $650; slightly used 15" Morris dredge pump, $5,000; new 15" Morris dredge pump, $8,000; 12" Ellicott dredge pump, thrust bearing & foundation, $4,000; DS 14-16 Morris pump, 4000 GPM, 315 RPM, $1,300; 7½ K.W., 115V, DC Lister Black Stone diesel generator, $1,350; 5 KW, 115V, DC LeRoi gas driven generating unit, $750; James speed reducer size 150, HS ratio 2.03-1, $450; James speed reducer, size 90, HS ratio 3-1, $250; 25 HP Foote reducer, ratio 14-01. $225; model 56S 2 cu. yd. Koehring heavy duty concrete construction mixer and lot spare parts, $2,500; various sizes elec. motors.

Contact: J. L. HARRISON
P.O. Box 108, Mobile, Ala. - Phone HE 3-5585

FOR SALE

3—10" McCully Gyratory Crushers
3—Traylor No. 412 Type TZ Gyratory Crushers
1—New RCA Metal Detector 10"x36" aperture
1—20" Traylor Heavy Duty Finishing Crusher
4—Allis Chalmers Gates "D" Crushers, Size 6
1—Traylor Rolls Crusher—30"x72"
1—Fuller Kinyon System
1—Allis Chalmers Compeb Mill (for Pulverizing Limestone)
1—Covered Steel Barge, suitable for carrying cement
1—Covered Wooden Barge, suitable for carrying cement
2—6' x 60' Dryers for Pulverizing plant

For information write:—

New York Trap Rock Corporation
230 Park Avenue, New York, New York
Telephone Murray Hill 9-8500

FOR SALE

GarWood model C-83 cable ripper. Excellent condition.

Mixermobile Model M-7, with 10 ft. tower extension and chutes. Good condition.

Blaw-Knox Model 95 Widener, 2 ft. to 10 ft. width. New August 1955. Excellent condition.

McCLUNG-LOGAN Equipment Company, Inc.
4601 Washington Blvd. - Phone ARbutus 3900
Baltimore 27, Maryland

FOR SALE

1—Barber-Greene, model 522 bucket loader, 1¾ yd. per. min. capacity, pneumatic tires, very good condition 1,250.00

1—Michigan, model T-6-K, ¾ yd. capacity Truck Crane, 25 ft. boom, tires very good condition. Price as is 5,000.00

HOWARD T. MORIARTY CO.
Contractors and Industrial Equipment
143 Broadway - Toledo 4, Ohio

FOR SALE

1 - ¾ yard Koehring Shovel Front $1,500.00
1 - ½ yard Link-Belt Shovel Front 800.00
1 - LaPlant Choate, 12 yard Scraper 2,000.00
2 - LeTourneau L.P., 12 yard Scrapers. Each 2,000.00
7 - DW-10's (IV1282 - IV1296). Each 9,000.00

M. R. Thomason, Contractor
Rt. 6, Box 21 - Phone 3-6414
Montgomery, Alabama

GEARHEAD MOTORS

MODEL	Stock No.	Co-Shaft RPM	H.P.
MASTER, Style 69683	1699-40	58	½
MASTER, Style 69681	1699-125	86	½
MASTER	1699-98	150	½
MASTER, Style 112963	1699-107	30	¾
MASTER, Style 70035	1689	72	¾
MASTER, Style 70529	1699-124	86	¾
MASTER, Style 69689	1699-110	58	¾
MASTER, Style 106308	1699-123	96	1
U.S. SYNCHROGEAR	1688	68	3
U.S. SYNCHROGEAR, Type SD-GH2	1699-102	190	3

SPEED REDUCERS

SAVE UP TO 75%
ON COMPLETELY REBUILT & GUARANTEED UNITS
30-day unconditional guarantee!
Performance Like New!

FALK MOTOREDUCER

MODEL	Stock No.	Ratio	H.P.
FALK, Size 44-DU (less motor)	1599-6	31.48-1	15
FALK, Size 44-DU (less motor)	1582	29.5-1	15
FALK, Size 3041-DUC (less motor)	1599-9	17½-1	30
FALK, Size 956-DZ (less motor)	1581	32.64-1	40
FALK, Size 44-RZ	1599-1	50-1	10
FALK, Size 40-RS (less motor)	1570	63-1	7½
FALK, Size 40-RZ (less motor)	1578	71.1	5

B & H MACHINE SALES

372 Woodmere - Detroit 9, Mich. - Phone Vinewood 3-6720

FOR SALE
EUCLID REAR DUMP

TRUCKS, 15, 22 & 35 Ton
BUCYRUS-ERIE Draglines, 2½ yd to 13 yd.
BUCYRUS-ERIE Shovels, ¾ yd to 8 yd.
NORTHWEST Draglines, ¾ yd. to 2½ yd.
NORTHWEST Shovels, ¾ yd. to 2½ yd.
MANITOWOC Draglines, 2½ yd. to 5 yd.
MANITOWOC Shovels, 2½ yd. to 5 yd.
MARION Shovels & Drags, 1½ yd. to 8 yd.
LIMA Shovels & Drags, 1½ yd. to 6 yd.
OSGOOD Shovels & Drags, 1½ yd. to 2½ yd.
PAGE Draglines, 5 yd. to 8 yd.
CATERPILLAR Graders & Dozers
HI-LIFT Shovels
2400 LIMA SHOVEL FRONT attachment
4500 MANITOWOC SHOVEL FRONT attachment
6" and 9" Drills, Diesel & Electric
OTHER EQUIPMENT AVAILABLE NOT LISTED ABOVE.

WILLIAM LUBRECHT, III
Construction Equipment
311 W. Diamond Ave.,
HAZLETON, PENNA.
Phone: Gladstone 5-4041 or 5-8253

ATTACHMENTS AVAILABLE

Northwest - Bucyrus-Erie - Lima - Marion - Link Belt - Lorain - P&H - Manitowoc. Shovels - Backhoe - Clam Drag - all sizes.

JAMES C. FRENCH
226 Berry Pkwy. Talcott 3-4927
PARK RIDGE, ILLINOIS

CRANKSHAFTS

New Process Rotokrome Plated

CAMSHAFTS REGROUND

Connecting Rods Rebuilt

Rotary Process Hard Chrome—Magnafluxing—Electric Heat Treating. Serving National Railroads, Bus and Truck Companies, including Diesel Equipped.

CLEVELAND HONE & MFG. CO.
8816 Harkness Rd., Cleveland 6, Ohio

Equipment Located in all Parts of the Country

TWO—4' SYMONS STANDARD CONES, COARSE BOWLS.
42" SUPERIOR McCULLY GYRATORY CRUSHER.
42 x 48 R.B. PIONEER & FEEDER, USED 14 MONTHS.
TWO—5 x 14 MARCY ROD MILLS.
30 x 42 Pioneer primary, unused, $86,000 value for $68,000. 25 x 40 Austin Western with feeder, grizzly & 100 hp. 32x40 Austin Western jaw. 4½' & 3' Symons. 36" Telsmith cones. A-C 322-R Hydrocone. 30" Superior McCully, 150 hp. 36" Superior McCully. 16-A & 10-A Telsmith. #371½ & 361½ Kennedy van Saun. 3630 Dixie hammermill. 5050 Cedar Rapids impactor port. 3030 impactor port. plant. Pioneer 54 x 24 double roll. Pioneer 54 x 24 triple roll portable plant. Rod mills 9½ x 12, 6½ x 14½. 6 x 7 feeder with grizzly. 10½ x 101 Traylor kiln. Joy continuous miner, low type. 50 ton/day hydrated lime plant. 125 TPD notation mill. Link Belt 2½ yd. shovel & three 15 ton Euclids, also 600 cfm compressor and bin and conveyor equipment all located in Southeast.
New List of Surplus Equipment Now Available.

STANLEY B. TROYER EQUIPMENT COMPANY
Box 97 Phone 500 Crosby, Minnesota

FOR SALE

Pulverizing Plant complete for producing agricultural lime dust or asphalt filler, consisting of:

1—Allis-Chalmers 7' x 24' Compeb mill complete with motor and magnetic clutch.
2—6' x 60' Dryers.
1—Sturtevant Air separator.
1—Fuller Kinyon pump for pumping dust to hopper or barges.

In addition we have other equipment in this plant such as screw conveyors, bucket elevator, screens, etc.

For information write:

New York Trap Rock Corporation
230 Park Avenue
New York 17, New York

DUAL JAW CRUSHER

Mfgd. by Iowa Manufacturing Co.

Openings
18" x 40" - 6" x 40"

New Guarantee — Located Our Yard

SEASTROM & CO.
2351 Kentucky Ave.
INDIANAPOLIS, INDIANA
Chapel 4-3346

PILE HAMMERS & EXTRACTORS

MC KIERNAN TERRY E4 EXTRACTOR
MC KIERNAN TERRY 9B3 HAMMER

THE SEABOARD STEEL CORPORATION
TEL. RINGLING 7-0461
4521 South Tamiami Trail
Sarasota, Florida

Blacktop Men Notice

Company has 6 plants and is anticipating putting 2 more in West Central New York State. Particularly interested in superintendents and mixer men. Guaranteed year round work.

Asphaltic Concrete, Inc.
P. O. BOX 1850
Rochester 3, New York

FIVE EQUIPMENT BUYS FROM FRANTZ

Joy 600 cu. ft. Air Compressor, International UD-1091 Diesel Engine. This machine, new in 1956, was used less than five months. Today's new price, $15,125.00 (E-5071).....$10,500.00

Koehring Model 301 Crawler Liftcrane with Waukesha Gasoline Engine and 45' crane boom. (E-5541).....$3,000.00

Caterpillar Model D-7 Crawler Tractor equipped with LeTourneau Cable Control Unit and Cable Bulldozer. Good running condition. 20% off list. (E-5117).....$4,500.00

Allis-Chalmers Model D Gasoline-Powered Tandem Grader equipped with Tractomotive Bucket Loader, Scarifier and Cab. Completely rebuilt. (E-4813).....$4,500.00

Bros Model SP-54 Self-Propelled Roller, mounted on nine 7.50 x 15 pneumatic tires, and powered by Continental Gasoline Engine. Used four months only. New price $5800.00. (E-4929) $3,800.00

FRANTZ EQUIPMENT CO.
50th & Wynnefield Avenue — Philadelphia 31, Penna.
GReenwood 7-7200

We do a Nation-Wide business in

STEEL SHEET PILING

380 pcs. 60 ft. Beth. DP-2—New York
292 pcs. 60 to 30 ft. Carn. M-116—Illinois
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180 pcs. 60 ft. Carn. M-115—Illinois
111 pcs. 45 to 40 ft. Carn. M-116—Alabama
490 pcs. 42 ft. Carn. M-116—Louisiana
244 pcs. 35 ft. Carn. M-116—Wisconsin
290 pcs. 35 to 15 ft. Beth. AP-3—Ohio
190 pcs. 25 ft. Beth. DP-2—Massachusetts

MISSISSIPPI VALLEY EQUIPMENT CO.
1906 Railway Exchange Bldg.
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RECENT INQUIRIES

Backhoe for 255A P&H
Lorain 75 Crane
Pulverizer for rock dust
Concrete Batching Plant
12 to 16 yd. Scrapers
¾ yd. Shovel
And many others

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CLEARING HOUSE ADS BRING RESULTS

ROLLER

HUBER - 10 Ton, 3-Wheel, with Scarifier & Sprinkler Tank.
Caterpillar Diesel Engine.
Rebuilt & Guaranteed. New 1948.

Anderson Equipment Company
Box 1737, Pittsburgh 30, Pa.
Phone: LEhigh 1-6020

BARGAIN

HETHERINGTON & BERNER DRYER

60" x 30' complete with electric motors, cold bucket elevator, exhauster, duct work, combustion chamber, with low pressure Hauck burner, fuel oil pump.
Very good condition. Located in Northern Indiana.

GEORGE H. HARTONG
340 SHERWOOD COURT
LA GRANGE PARK, ILL.

DEPENDABLE USED MACHINES

Northwest 80D dragline
Bay City ½ yd. Diesel hoe
Cletrac DGH; Drott loader
B-G hopper car unloader
B-G 30" x 73' conveyor
Port. gravel plant; Diesel power.

TRACTOR & EQUIPMENT CO.
10032 Southwest Highway, Oak Lawn, Ill.

FOR SALE
CONSTRUCTION EQUIPMENT

1201 Lima Dragline, 85', 3 yard
955 P&H Dragline, 90', 2½ yard
54-B Bucyrus Erie Drag, 85', 2½ yd.
54-B Bucyrus Erie Comb. Drag-Crane
1001 Lima Dragline, 80', 2½ yd.
80-D Northwest Drag, 65', 2½ yd.
802 Lima Cranes
604 Lima Combination Shovel - Crane
25 Northwest Combination Shovel - Crane
80-D Northwest 2½ yard Shovel
3000-B Manitowoc 2 yard Shovel
38-B Bucyrus Erie 1½ yd. Shovel
44 Lima 1 yard Backhoe
LS-85 Link Belt 1 yard Shovel
General 1 yard Shovel
34 Lima ¾ yd. Shovel
22-B Bucyrus Erie Backhoe
Unit 1020 ¾ yard Shovel—1 yr. old
Bay City, Lorain, P & H, & Osgood Truck Cranes
Shovel, Drag, Crane & Backhoe Attach. - Drag & Dipper Buckets for most makes and models
Euclid Trucks—27FD, 18FD, 8TD, 36FD, 82FD, 13TD, 14TD, 63TD—Bottom & Rear Dumps
Garwood, LeTourneau, Caterpillar, Euclid & Bucyrus Erie Scrapers
Huber 3-5 ton Tandem Roller
Buffalo-Springfield 10 ton Roller
International Bulldozers
Allis Chalmers & Caterpillar Dozers, Front End Loaders, Graders, Carryalls
600 Reich Heavy Truck Mounted Rotary Air Drills (Both Lever Arm & High Mast)
58-BH Joy Champion Rotary Air Drills
42-T, 29-T & 27-T Well Drills
Davey Rotary Truck Mounted Air Drills
Mayhew Rotary Truck Mounted Air Drills
Portadrill Truck Mounted Air Drill

FRANK SWABB EQUIPMENT CO., INC.

313 Hazleton Nat'l. Bank Bldg.

Hazleton, Pa. GLadstone 5-3658

FOR SALE OR RENT

Eight Euclids, Rear Dump Model 36 TD
Caterpillar D-9 Bulldozer
Caterpillar No. 12 Grader
Northwest 80 D 2½ cu. yd. Shovel
CP 900 cfm Compressor - G. M. Diesel

All Equipment Latest 1956 Models
Excellent Condition

Call Mr. Smith

BELL EQUIPMENT CORPORATION

489 Fifth Ave. New York 17, N. Y.
Murray Hill 2-2492

FOR SALE — BARGAIN

Brand new 50-ton Talbert trailer, removable gooseneck, dropside deck. This unit has never had a load on it.....$10,950.00

Bituminous Trucking & Equipment Co., Inc.

Chicago 8, Ill. Calumet 5-5280

NEW SINGLE AXLE LOW BED TRAILERS

For Only **$1800**

12 Ton Capacity - Weight 5600 Lbs.

Complete with all lights, straight air brakes, lashing rings. Sloped after deck, dry Oak 2" floor, 26' over all length, 15' flat deck. Very easy to load. Only 30" to flat deck. 750x15, 12 ply tires. 10" main I beams, 8" channel iron on sides, rigidly braced. One slightly used for $1,250.00. Other types built on request.

S. J. ADAMS

Old Stage Road - Raleigh, N. C. - Phone TE 3-6516

MANITOWOC CRANES & SHOVELS
FOR SALE

1—Model 2000B Clamshell and Dragline
1—Model 3500 Shovel with Torque Convertor, very good condition
1—Sectional Type Barge, 30 x 50—like new

C. R. SUNDBOOM

2288 UNIVERSITY ST. PAUL, MINNESOTA
Midway 6-8889

FOR SALE

Model 95 Northwest with 70 ft.
Drag Line and Fair Leads. Seen very little use—too big for present operations.

Concrete Trans-Mix Corp.
P. O. BOX 1850
Rochester 3, New York

FOR SALE CHEAP

D-13000 Cat Power unit completely rebuilt $2750.
D-4 Cat sideboom $4500.
D-4 Cat trackon high lift $1750.
Irrigation pump $750.

Write or call for our price on rebuilding D13000 and D17000 Cat engines with new motor guarantee.

PHIL BRIDWELL
Paris, Ill.

FOR SALE

2—1½ cu. yds. ESCO Full Leaf Orange Peel Rock Buckets, Serial Nos. 323 & 330 (1956), very little wear.....Each $4,000.
1—ADAMS Model 414 Motor Grader, with 12 ft. Moldboard, Powered by INTL. UD-14A .....$ 8,000.
1—Cat. D-7, #3T18713, with Cat. Cable dozer. Operated Approx 2800 Hrs., Completely overhauled June 1956.....$14,000.

All of above equipment in excellent condition—

W. F. Magann Corporation
2420 High Street Portsmouth, Va.

CRAWLER PARTS
Clearance Sale
NEW - 25% DISCOUNT

Roller Assemblies, Bushings, Bushing Assemblies, Shafts, Grease Seals. (Roller, Idler and Final Drive) for D-8, D-7, D-6, D-4 & TD-18. Front Idler for D-8.

LIKE NEW!

D-4 Rails (2) with Grouser Pads..$635.00
Rebuilt (with new pins and bushings)!
D-7 Rails (2) $925.00

Allied Welding & Mfg. Co.
6829 W. 39th St. - Ph. Gunderson 4-3437
Berwyn, Illinois
Precision Rebuilders of Crawler Parts, New and Exchange Parts for all makes Tractors and Cranes.

FOR SALE - BARGAIN
USED PORTABLE
CRUSHING PLANT

24x36 Jaw Primary, Apron Feeder Truck Hopper and Cat D13000 Power Unit. Diamond Model 95 Secondary Plant, 4x12 Screen, 40x22 Roll Crusher with Cat D 17000 Power Unit. Complete with 21 yard Storage Bin, Two Lattice Frame Conveyors and $10,000.00 worth of spare parts.

THE ROY KLOSSNER CO.
P. O. Box 8143 - CA 4-6611
SAN ANTONIO, TEXAS

#34 LIMA 25-TON CRANE

35' Boom. Fairleads for Dragline work. On 6 wheel drive carrier, good condition. Will be available for delivery 1st of October. Additional boom available @ $20.00 per foot. This crane is in our private service.

ACE STEEL CONSTRUCTION CO.
2301 West 59th St. - Chicago 36, Illinois
Phone Walbrook 5-7733

Manufactures' Literature

Dust Control for Rock Crushing Plants

Specially engineered systems of controlling dust in rock crushing plants are described in a new brochure issued by The Johnson-March Corp., 1724 Chestnut St., Philadelphia 3, Pa. Illustrated are important points where the systems, known as Chem-Jet, can be supplied. The folder describes the advantages of the systems and how they suppress dust at its source. Equipment and Compound M-R surface active agents used with the systems are also described. Photographs show effectiveness of this dust control method with systems turned on and off. Reference is made to special scrubbers for asphalt plants, and to the company's engineering services.

For more information circle 151 on Service Coupon Page 16 and mail now.

Wire Rope Slings And Assemblies

A new 54-page catalog "Roebling's Wire Rope Slings and Assemblies" is available from John A. Roebling's Sons Corporation, Trenton 2, N.J. The publication, a new concept of sling cataloging, was designed for quick and accurate sling selection and ordering. It is organized around a simplified coding system that should be helpful to those concerned with materials handling problems. The catalog contains information on the following: All-purpose slings with tapered sleeve attachments; Roegal cable-laid slings; flat-weave slings; railroad slings and special assemblies; fittings.

For more information circle 152 on Service Coupon Page 16 and mail now

Cranes and Excavators

A new illustrated brochure of its crawler mounted new Model 254 cranes and excavators has been published by The Hanson Clutch and Machinery Co., Tiffin, O. Engineering details and features of the model which can be used for crane, clamshell, dragline, shovel, trench-hoe, magnet or pile driver applications, are explained and detailed. Such patented Hanson features as the crowd and hoist clutches and the swing clutch shaft assembly are illustrated and explained. The brochure shows an exploded view of the friction control mechanism of the independently powered boom hoist. Crawler mechanism, lower bed assembly and the upper turret bed are shown in stripped away pictures so that engineering design is visible. Many of the applications of the crawler mounted model are shown in full illustration.

For more information circle 153 on Service Coupon Page 16 and mail now.

With the Manufacturers and Distributors

COWLIN NEW RESEARCH DIRECTOR FOR EATON. Sydney E. Cowlin, formerly advertising and sales promotion manager for the Reliance Division in Massillon, O., has been appointed director of market research for Eaton Manufacturing Co., Cleveland, O.

NEW DISTRIBUTOR FOR MICHIGAN LINE. Kansas Engine & Equipment Co., Inc., 2015 S.W. Boulevard, Wichita, Kans., has been appointed to sell and service Michigan tractor shovels and excavator cranes, products of the Construction Machinery Division of Clark Equipment Co., Benton Harbor, Mich.

SALES APPOINTMENTS BY FWD. Lynn F. Perrott, Portland, Ore., and Virgil Phelps, Akron, O., have been appointed district sales managers for Four Wheel Drive Auto Co., Clintonville, Wis. Perrott replaces Robert J. Peterson, recently promoted to an assistant sales manager position with FWD.

APPOINTED TRUCK ENGINEER FOR GMC. D. J. LaBelle has been appointed truck engineer of GMC Truck and Coach Division. He succeeds L. T. Flynn who has been transferred to Fleet Sales Repartment of GMC Truck Sales Division.

NEW EUCLID DISTRIBUTOR. Interstate Tractor & Equipment Co., Portland, Ore., has been appointed authorized Euclid dealer in Oregon and river counties of southeastern Washington by the Euclid Division, General Motors Corporation, Cleveland, O. Interstate has purchased the assets of P. L. Crooks & Co., former Euclid dealer in the area.

NEW P & H DIESEL DISTRIBUTOR. Rental Service Co., 4605 North 4th St., Philadelphia, Pa., has been appointed distributor for a three state area by Diesel Engine Division, Harnischfeger Corporation, Crystal Lake, Ill.

WAYNE NAMES LINK CHIEF ENGINEER. Charles T. Link, Jr., has been appointed chief engineer of Wayne Manufacturing Co., Pomona, Calif. He will be responsible for engineering and design of the firms' entire line of power sweeper and motor vehicles.

NEW ASST. SALES MANAGER FOR

HOUGH. Robert L. Knox and Herman R. Brown have been appointed assistant sales managers of Frank G. Hough Co., Libertyville, Ill. Knox, who has been a district sales representative, will take charge of distributor sales and the contacts with field personnel. Brown, formerly manager of the order and distribution section of the sales department, will assume direction of manufacturers sales including export, government and supplemental equipment as well as scheduling operations.

WHEELBARROW FIRM MERGES. The Lansing Co., Lansing, Mich., for over 75 years a manufacturer of wheelbarrows and concrete carts, has merged with the Lansing Steel Fabricators, Inc., Lansing, Mich. Merging of the two firms increases production facilities and capitalization of the new corporation. Construction is underway on a $200,000 expansion and modernization project to provide better production and office facilities.

VEON CHEMICAL APPOINTS 4 DISTRIBUTORS. Veon Chemical Corporation, Long Island City, N. Y., has appointed four new distributors to further expansion of its sales program for Perma-Line, new street marking compounds. The distributors are Burgess H. Spinney, Veon Corporation of New England, 21 Rosemont Road, North Weymouth, Mass.; Morris Alexander, Dura-Line Corporation, 100 West Monroe St., Chicago, Ill.; Jack Hulett, Kar-Trol Signal Co., Inc., 2425 South Boulevard, Houston, Tex.; and Sherman L. Christensen, Traffic Applicance Corp., 4207 Willimet Ave., Los Angeles, Calif.

EUCLID WESTERN REGIONAL OFFICE MOVES. The Western regional office of Euclid Division, General Motors Corporation, Cleveland, O., has been moved to new offices in the El Dorado Bldg., 360 22nd St., Oakland, Calif. M. H. Johnson, western regional manager and W. B. Dickerson, district representative, now have their headquarters at this new location.

BRIGLEB APPOINTED SALES MANAGER. Robert C. Brigleb has been appointed sales manager of replacement sales department of the S. K. Wellman Co., Cleveland, O., succeeding Thomas A. Novotney, who has retired. James E. Clegg, Philadelphia branch manager succeeds Mr. Brigleb as assistant sales manager.

DANIEL APPOINTED REX DISTRICT MANAGER. W. Young Daniel has been appointed Southeastern Manager for Rex Construction Machinery Division,

Chain Belt Co., Milwaukee, Wis. Mr. Daniel replaces Art Schmidt who has returned to the Milwaukee office for further assignment. Mr. Daniel's duties will govern the sales activity of Rex Construction Machinery district sales offices in the Georgia, North Carolina, South Carolina, Florida, Tennessee, and Louisiana areas.

KIND NAMED LeT-WESCO REPRESENTATIVE. W. T. (Bill) Kind, heretofore in the field engineering department, has been appointed district representative in the Pacific northwest for LeTourneau-Westinghouse Co.

SMITH APPOINTED MANAGING DIRECTOR. Roy Edw. Smith has been appointed managing director of Corrugated Metal Pipe Association, 140 South Dearborn St., Chicago, Ill.

HEFFRON PROMOTED BY "QUICK-WAY". Daniel S. Heffron, has been elected vice president of the "Quick-Way" Truck Shovel Co., Denver, Colo. Heffron, well known in the construction equipment field, has been director of sales for "Quick-Way" since 1944 when he came to Denver from Chicago, Ill., where he was vice president of the Midland Refractories Co.

BORING APPOINTED DIVISION MANAGER. James H. Boring has been appointed Pittsburgh division manager for The General Tire & Rubber Co., Akron, O. As head of the newly formed division, Boring, formerly division manager at Richmond, Va., will direct sales of General tires and related products in areas of New York, Pennsylvania and Maryland.

JONES APPOINTED ASSISTANT SALES MANAGER. Harry S. Jones has been appointed assistant sales manager in charge of domestic sales by Athey Products Corporation, Chicago, Ill. He was district representative in North Central states for Athey.

WHAT ABOUT YOU, MR. READER?

Are you still active in the field? Have you moved or changed your position?
Unless you send this information directly to us we can't be sure. Sometimes a reader's name is cut from the mailing list because we are not sure that our information as to name, title and address is right. *Your* name might be cut from the mailing list.

Don't Let This Happen to You

Even if you think we know all about you, please fill in the information requested below and send to us by return mail. Our auditors require proof of accuracy of our mailing list. *You* are the only person who can help us on this. Do it now before you forget, so you can be sure your magazine will always be properly addressed to you. New names cannot be added or old names retained on our list unless we have *all* this information. *Please print or type.*

ROADS AND STREETS DATE _____

22 WEST MAPLE STREET, CHICAGO 10, ILL.

☐ I do receive ROADS & STREETS and wish to continue to receive it.
☐ I do not receive ROADS & STREETS but would like to have it.

NAME _____

TITLE OR OCCUPATION _____

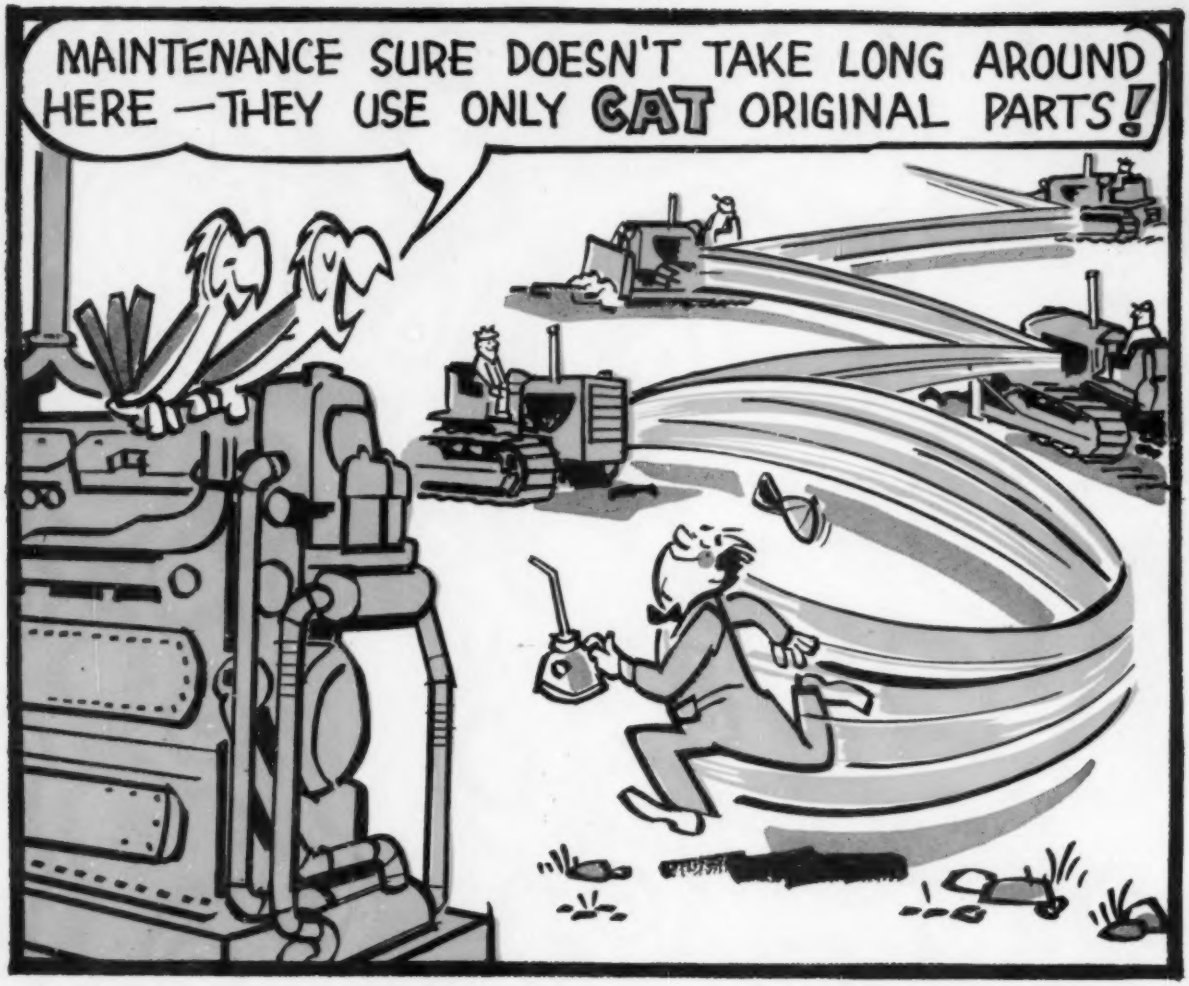
FIRM NAME OR GOVERNMENT DEPARTMENT (give street address) _____

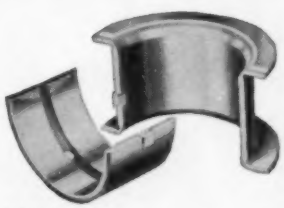
_____

CITY _____ ZONE (if any) _____ STATE _____
(If you have moved give *old and new* address)

SIGNATURE _____

INDEX TO ADVERTISERS





An engine bearing—not big, but mighty important. If it's a CAT* bearing, it's an *exclusive combination* of aluminum alloy—extra strong with just the right degree of hardness. But if it's a "look-alike" bearing—who knows?

Be sure to get parts you can trust—from your Caterpillar Dealer. He always has the *exact* part you need. Play it safe—don't be fooled by "look-alikes."

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

. . . for more details circle 204, page 16

Laying hot-mix Texaco Asphaltic Concrete wearing surface over a sand-shell base and sand-loam sub-base on 19 miles of Texas State Route 73.

CONTRACTORS

F. & C. Engineering Company, Inc., Houston, prime contractor. Gulf Bitulithic Company, Houston, asphalt contractor.

The highway problem here was a low-bearing-value subgrade

Texas is building a shorter highway link between Houston and Port Arthur's large oil refineries. A major problem in the construction of the 19-mile section shown here was the low bearing value of the underlying subgrade.

The answer to the problem was a completely flexible highway, from the subsoil up. Selected material, sand-loam, was laid to a thickness of 12 inches on the subgrade. Next came a sand-shell base 10 inches thick, primed with Texaco MC-1 Cutback Asphalt. A 2-inch wearing surface of hot-mix Texaco Asphaltic Concrete completed the project.

The top-to-bottom flexibility of such a highway assures complete and continuous contact with the subgrade, resulting in greater durability and lower upkeep cost.

Whether the project is a State Highway in Texas, a landing surface for guided missiles in Florida, or a heliport for military helicopters in Virginia, there is a type of Texaco Asphalt construction exactly suited to the requirements. Helpful information on methods and materials recommended for all asphalt pavement types is supplied in two booklets. Copies may be secured without obligation by writing our nearest office.

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